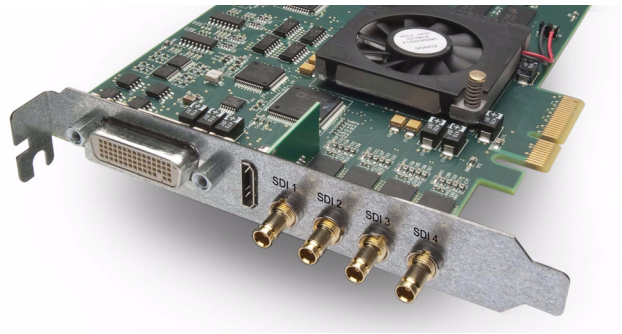
www.aja.com

KONA 3G



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Installation and Operation Guide

Because it matters.

AJA® VIDEO SYSTEMS

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180 Litton Drive, Grass Valley, CA. 95945 USA

Telephone: 800.251.4224 or 530.274.2048
Fax: 530.274.9442

Web: http://www.aja.com
Support Email: support@aja.com
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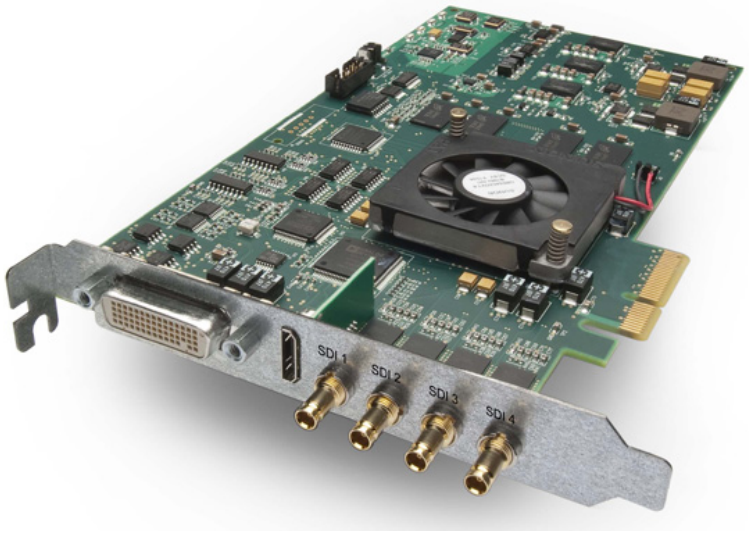
Chapter 1: Introduction



Overview

The AJA KONA 3G provides the highest quality whether working with SD, HD, Dual Link HD, or 3G signals. KONA 3G even supports 2K digital cinema and film resolutions and now offers a 4K playback mode for the highest resolution possible. The 3G is designed for use with PCI Express capable computers. KONA 3G offers:

- 3D workflow support – discrete left and right eye output in SDI and HDMI 1.4a
- 4K output mode with playout in both YCbCr and RGB

  Note: In 4K Mode, all four mini-BNC connectors are used for outputs. 4K requires bootup from its own alternate firmware image, see *"Firmware Tab Screen" on page 86*. For details on 4K Mode operation, see *"Using 4K Mode" on page 88*
- Unsurpassed 10-bit broadcast quality serial digital video input/output
- 8-channel digital AES/EBU audio input/output (16-channel using the K3G-Box)
- 16-channel embedded audio
- Hardware-based upconversion from SD to HD; hardware-based downconversion from HD to SD; and HD to HD crossconversion between 720 and 1080 HD formats
- DVCProHD and HDV hardware scaling support

KONA 3G is designed to be the ultimate capture and playback card. AJA provided software utilities and applications deliver leading features for broadcasters and filmmakers.

A state of the art PCI-Express card, KONA 3G plugs into a PCI-e expansion slot in MacPro PCI-Express enabled computers. The card comes with software that allows it to work seamlessly with Final Cut Pro and other QuickTime-based applications to provide a professional broadcast quality editing suite, corporate/industrial video center, or high-powered desktop video setup—or anything in between. Included is a cable set that can be connected to a variety of SD, HD, Dual Link,3G, and 2K capable equipment. For even easier connectivity, an optional K3G-Box rack mountable breakout box is available and ships with it's own multi-connector cables.This manual covers the installation and operation of the KONA 3G, the optional K3G-Box, and how to use the card with Final Cut Pro and other software applications.

Features

The KONA 3G card offers many unique features for optimum quality, ease of use, and support for a wide variety of post production workflows.

Hardware

- SD-SDI, HD-SDI, Dual Link HD-SDI, HSDL, and 3G HD-SDI inputs
- HDMI 1.4a output for stereoscopic monitoring to consumer 3D displays
- 2K support that includes 2048x1556 and 2048x1080 formats
- 4K playout (see *"Video Formats" on page 117*)
- x4 Lane PCI-Express Bus Interface
- DVCProHD hardware scaling acceleration
- HDV hardware scaling acceleration
- Final Cut Pro Dynamic RT Extreme hardware acceleration
- Broadcast quality hardware based 10-bit upconversion
- Broadcast quality hardware based 10-bit downconversion
- Broadcast quality hardware based 10-bit crossconversion (1080 to 720 and 720 to 1080)
- Broadcast quality hardware based 10-bit SD aspect ratio conversion (anamorphic to letterbox, etc.)
- 12-bit HD component analog video and SD analog component or composite and s-video output
- 10-bit HD/SD Video+Key Output
- HD/SD Hardware Downstream Keyer
- LTC (longitudinal timecode) input/output
- 8-channel 24-bit, 48kHz digital AES/EBU audio
- 16 channels of SDI embedded digital audio
- RS-422 control via 9 pin
- Genlock input with optional looping capability via the K3G- Box (terminated on the supplied breakout cable)
- Standard 2 meter length connection cables including HDMI mini to HDMI output cable.

3D Stereoscopic Workflow

KONA 3G offers you the simplest path through 3D stereoscopic workflows.

Through SDI, you can output Discrete Left and Right Eye feeds with a simple Stereo button choice in the AJA control panel. Additionally, muxed stereo output is possible using a single SDI output. AJA hardware and software works in close collaboration with CineForm's Neo3D software tools and CineForm codec to allow stereoscopic editorial and viewing when working with Apple's Final Cut Pro or Adobe's CS5.

Through it's HDMI 1.4a output, KONA 3G makes it possible to connect to affordable 3D-capable monitors for stereoscopic monitoring.

Broadcast-Quality Conversion

KONA 3G features hardware-based full 10-bit broadcast quality motion adaptive SD to HD upconversion, HD to SD downconversion and HD to HD crossconversion. The quality of the conversion features found in the KONA 3G is virtually identical to AJA's award winning stand-alone converter products used throughout the post production market. The KONA 3G built-in upconverter uses a a full 10-bit path, fully motion adaptive de-interlacing, and large multi-point digital interpolators. Downconversion uses large multi-point digital interpolators, anti-alias filtering and interpolation.

Crossconversion is high-quality hardware-based, providing capability to streamline dailies and offers true broadcast picture quality in realtime. Because these functions are in hardware on the card, they are available full time, all the time—with no CPU load. Such conversions are useful for cost effective monitoring, making standard definition dubs of an HD project, or upconverting from a standard definition FCP project to an HD deliverable.

KONA 3G Audio

KONA 3G supports 8-channel 24-bit 48kHz AES audio via BNC connections on the supplied breakout cable—or with the optional K3G-Box,16-channels of AES audio.

KONA 3G's high-quality input sample-rate conversion on AES inputs eliminates the need for audio source synchronization. Sample rate converters auto-lock to any AES input, 32-96kHz, and then convert it to 24-bit 48kHZ audio, locked to internal KONA 3G video. Sample rate conversion is done at very high quality (over 120db THD).

Dual Link

KONA 3G supports Dual Link HD-SDI (4:4:4). KONA 3G supports the ingest and output of SMPTE-372M compliant 4:4:4 RGB video and high-bandwidth 4:2:2 1080p 50, 1080p 59.94, and 1080p 60 at 10-bit.

2K Workflow Support

The KONA 3G 2K path offers potentially significant cost and labor savings over a tape-based approach to a 2K workflow. In a unique development for customers on the Apple platform, users can go straight from telecine to disk with 2K media and eliminate steps requiring the use of tape stock and then the digitizing of those tapes for the nonlinear editor. 2K telecine to KONA 3G saves time and steps in the process by directly and simultaneously creating 2K DPX files and 2K QuickTime reference movies. Material can be played out at 2K via HSDL (High Speed Data Link), offering further synergy with other 2K products, such as projectors or DDRs, currently available in the market.

Additionally, KONA 3G allows 2K files to be viewed on HD 1080PsF supported video monitors, lowering the price barrier for recording to tape and viewing 2K material. This 1080 HD playout can be down-converted to SD in real time, giving the 2K DI pipeline a powerful solution for multi-format video playout of 2K material.

By generating 2K DPX files during the digitize phase, different parts of the process (for example, delivery of full-resolution media of shots intended for visual effects) can be

done much earlier. Offline editing can be done in Final Cut Pro and with the flexibility of Final Cut Pro and QuickTime, even a 2K online is possible.

4K Playout Mode

KONA 3G offers 4K playback in both YCbCr and RGB. When 4K playout is selected, the four SDI connectors are remapped as outputs for driving the four quadrants of a 4K display. A large number of 4K formats are supported for this emerging workflow; see the specifications (*"Video Formats" on page 117*) for supported 4K formats.

Hardware-based Acceleration

Final Cut Pro users will likely notice the DVCPROHD, HDV, and Apple RT Extreme hardware acceleration provided by KONA 3G. This hardware acceleration was developed in close cooperation with Apple. How does KONA 3G accelerate DVCPROHD, HDV, and Apple RT Effects? A precision hardware scalar in KONA 3G does what the Apple computer's processor would otherwise have to do, scale less than full-raster HD (DVCProHD and HDV) to full-raster size, thus speeding up the system considerably—and doing this scaling at full 10-bit broadcast quality.

When using the Final Cut Pro HDV codec, the KONA 3G advanced scaling engine takes the native frame (long GOP 1440 HD) and outputs it via hardware-in real time. Precision AJA circuitry re-sizes the video to full-raster 1920 x 1080, providing instantaneous playback of HDV captured by Final Cut Pro for both monitoring and recording.

Unlike the DV25 format, which can preview in realtime natively via Final Cut Pro, the MPEG structure of HDV is much more complex. Fortunately, KONA 3G can provide real time monitoring and playback to both HD and SD monitors and decks via the realtime hardware scaler and down-converter on board.

In addition to speeding up Final Cut Pro Dynamic RT by using the KONA scalar, multiple frame size RT (1/4 size or full size)—a Final Cut Pro feature—also benefits from KONA 3G. The frame count and image size are dynamically changed during file playback, so you don't get the "un-rendered" message in Final Cut Pro.

Internal HD/SD Hardware Downstream Keyer

KONA 3G provides a powerful hardware keyer that can place graphic files with an alpha channel over video in a selectable matte or the contents of the card's framebuffer from a software application (AJA TV / Apple's Final Cut Pro / AJA's VTR Xchange). Key a bug or text over picture and avoid what might normally be a lengthy software render. Also, working with these software applications, you can key video that has an alpha-channel over video input or a matte. For example, you can load a QuickTime clip that has an alpha-channel (a flying logo generated in the Animation codec) into AJA TV and then place it over live video coming into the card and then passing both on to a VTR for recording or broadcast.

Software

- AJA Control Panel for audio/video source selection, conversion and control of KONA 3G within the overall MacOS environment (Input Pass-through)
- AJA QuickTime™ Drivers for tightly integrated hardware/software operation
- Support for Apple Final Cut Pro™ (application software not included)
- Support for After Effects, Combustion, Motion, and other application software not included.
- AJA Utilities: AJA TV, VTR Xchange, AJA System Test, AJA DataCalc, AJA QTtoDPXtranslator, and AJA DPXtoQTtranslator.

AJA's KONA 3G software and hardware were developed for use with Final Cut Pro for powerful integrated video/audio capture, editing, and video production. With a MacPro, FCP, and KONA 3G, you have the ultimate system for standard definition—and high definition—video production and DI work. Software is supplied on CD, including the AJA Control Panel, drivers for the card itself, and all files necessary for Final Cut Pro and other application support.

KONA 3G Supports Final Cut Multi-cam Feature

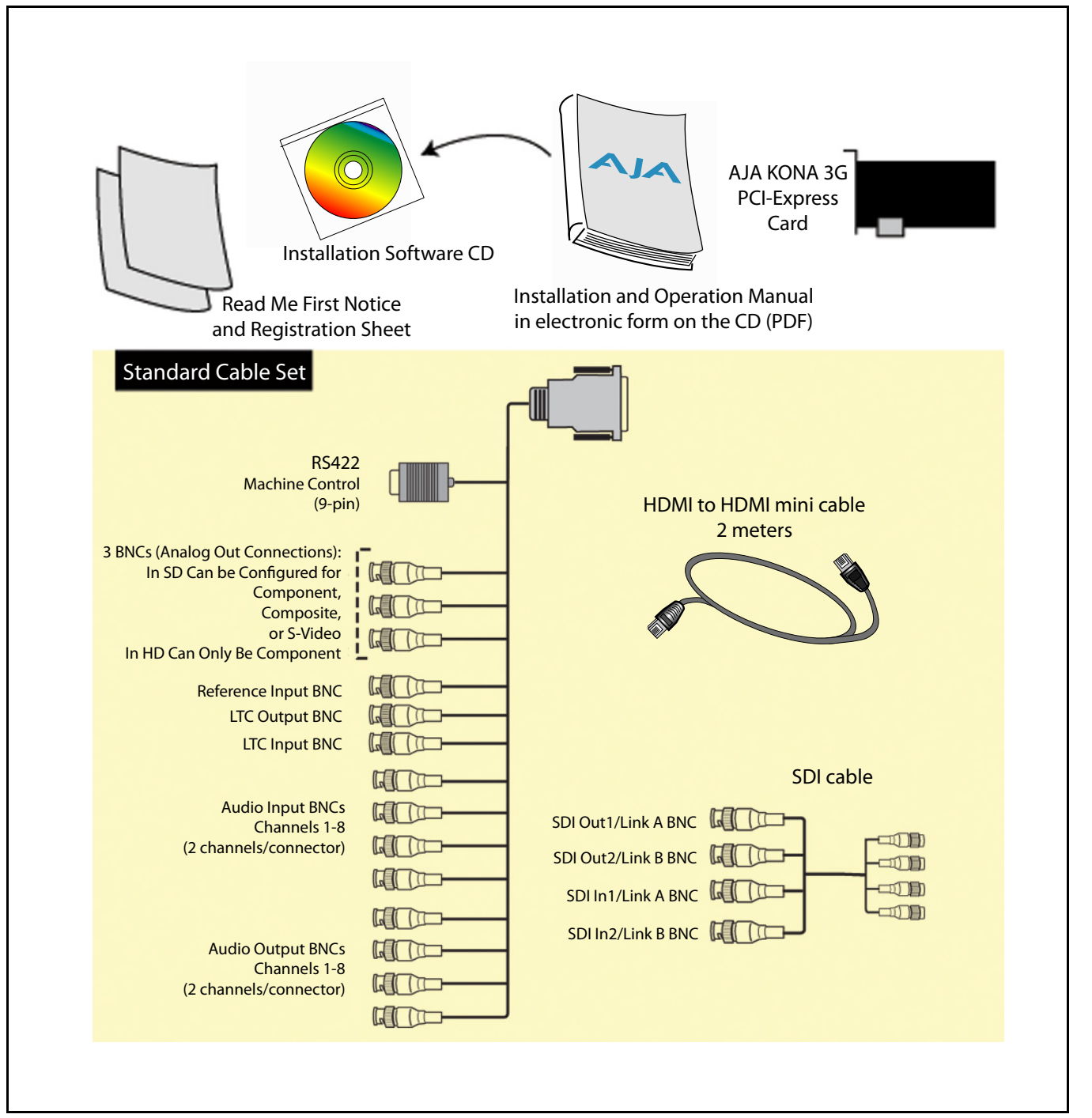
Final Cut Pro 5 and later provides multi-cam playout-and KONA 3G supports it. With KONA hardware and a sufficient storage solution, you can handle up to 16 sources in real time. Each stream of video is captured individually and then ganged together in Final Cut Pro for a multi-cam editing workflow. The KONA 3G hardware plays the multi-cam clips out to professional broadcast monitors or decks, via SDI, HD-SDI or via analog video. Up to 16 sources can be viewed in real time via the KONA (4-up, 6-up, 9-up, 16-up, etc.) -or each individual source can be viewed as it is selected via Final Cut Pro.

What's In The Box?

When you unpack your AJA KONA 3G, you'll find the following components:

- AJA KONA 3G Software and Documentation CD-ROM—this CD contains the software installer to place KONA 3G drivers and the Control Panel on an Apple Mac. Due to the pace of innovation, it is best to install the latest driver version from the AJA website: *http://www.aja.com/support/konaNEW/kona-3-3x.php*
- Install the software as discussed in this manual in *Chapter 3: Installation and Configuration.* The CD also contains a wide variety of useful information, including this manual you're reading (PDF format).
- KONA 3G 4-Lane PCI-Express card.
- Cable, HDMI mini-to-HDMI output
- Cable, KONA 3G SDI In/Out—mini-connectors on the card (technically called "1.0/2.3 connectors") connect to full-size BNCs for ease of use and compatibility with professional equipment.
- Cable, AES BNC digital audio connectors, RS422, and Reference Input.
- Read Me First Notice, Registration sheet, and any other late-breaking news and/or errata related to KONA 3G.

Please save all packaging for shipping the KONA 3G should you wish to do so when moving or sending it in for service.



KONA 3G Shipping Box Contents

System Requirements

AJA Video recommends that your system meet minimum hardware and software requirements to achieve a satisfactory level of performance when operating it. Here, we provide minimum and recommended requirements and then discuss disk storage issues that should be understood for proper system configuration.

Minimum and Recommended System and Software Requirements

The following table outlines the system hardware and software needed.

Item	Recommended
Recommended KONA driver for Mac OSX and Final Cut Pro: ***Note:*** always consult the release notes for the AJA software version you are running (included with installer)	FCP 7.0.x - KONA driver version 9.0 (Snow Leopard compatible) *http://www.aja.com/support/konaNEW/kona-3g.php*
Macintosh Tower:	**Recommended KONA 3G System:** Apple Mac Pro, 2GHz or better, 4GB of ram or greater for uncompressed HD. Use of a Fibre Channel, SCSI, SAS or other high bandwidth disk array for uncompressed SD/HD/2K storage. **Minimum KONA 3G System:** MacPro with PCI-Express, 2GHz with 2GB RAM minimum for uncompressed SD or 4GB RAM for uncompressed HD. Ensure your Macintosh has a PCI-Express slot available for KONA 3G card. Use a Fibre Channel or SCSI external RAID for uncompressed SD/HD storage. **Slot Placement:** Visit our website and view this regularly updated slot placement document: *http://www.aja.com/support/kona/kona-system-configuration.php*
Internal Storage (SATA inside Mac):	Best suited for compressed SD/HD formats only
External Storage: ***Note:*** see Storage Methods topic that follows later in this Chapter	Ideally a RAID configuration with Fibre Channel or SCSI connection to the Mac via qualified host bus adapter

Understanding Disk Storage Methods

The KONA 3G card, an Apple MacPro, and Final Cut Pro, together offer an unprecedented level of features and performance for audio/video post production applications. However, to ensure performance and quality, the disk storage system used with the Apple computer must be able to meet the demands of the media.

For uncompressed SD, AJA recommends that at a minimum, the disk storage system must be able to provide and maintain a consistent 50 MB/sec transfer rate from the Apple computer to disk (read/write). There are a variety of system configurations and peripherals that can provide this level of performance.

For uncompressed single link HD, AJA recommends that at a minimum, the disk storage system must be able to provide and maintain a consistent 200 MB/sec transfer rate from the Apple computer to disk (read/write). There are a variety of system configurations and peripherals that can provide this level of performance.

For uncompressed dual link HD and 2K, AJA recommends that at a minimum, the disk storage system must be able to provide and maintain in excess of 300 MB/sec transfer rate from the

Apple computer to disk (read/write). There are a variety of system configurations and peripherals that can provide this level of performance.

KONA 3G users wishing to configure a storage for a system should also be aware that raw benchmark numbers alone do not necessarily reflect the performance of a drive solution. Other factors, like drive seek time and controller cache also affect performance especially with regard to the bandwidth requirements of SD, HD, dual link HD and 2K files.

About RAIDs

Redundant Array of Independent Disks, or RAID, is a group of hard drives that appears to the host computer as a single high-speed storage unit. RAID systems increase storage capacity and provide the performance, reliability, and data protection needed for video production, that is not be possible from a single hard drive. Drives inside the RAID array operate simultaneously, increasing overall throughput. RAID configurations can be comprised of:

- Striping data across multiple drives for storage performance (RAID 0).
- Mirroring for redundancy (RAID 1).
- Parity for data protection (such as RAID 5).

Most RAID configurations, or RAID levels, combine these to provide a balance of protection and performance.

Striping divides a drive into data blocks, or stripes, that are distributed across an array of physical drives. Striping a set of disks improves performance because each drive operates concurrently. However, striping alone, known as RAID level 0, offers no data protection.

Mirroring involves writing identical copies of all data to a pair of physical drives. This results in very high data reliability: If one drive fails, the data is still available on the remaining disk drive. However, it also results in a storage efficiency of only 50 percent, because two physical drives are required to achieve a single drive's capacity. Mirroring alone is known as RAID level 1.

Parity provides data protection without requiring complete duplication of the drive contents. In the event of a drive failure, parity information can be used with data on surviving drives to reconstruct the contents of a failed drive. Parity data can be stored on a dedicated drive, as in RAID 3, or distributed across an array of drives, as in RAID 5. Parity provides much greater storage efficiency than mirroring-up to 85 percent for a set of seven drives.

Software For Striping

AJA recommends the Disk Utility software provided by Apple with OS X for creating and striping RAIDs, including 3rd-party, SCSI and Fibre Channel RAIDs. This utility can be found in *Macintosh HD/Applications/Utilities*, where "*Macintosh HD*" is the name of the system drive.

Storage Example: AJA KONA 3G for Dual Link HD and 2K resolutions

AJA can recommend the following examples of drive configurations to support certain specified video and digital film resolutions and their associated bandwidth requirements. If a particular drive array or manufacturer is not listed, it may simply be because AJA has no experience with the company or a particular unit. This guide simply offers examples that AJA has used with success when working with the specified formats listed. With any device, actual results may vary from unit to unit and proper configuration of the drive array and any ancillary items such as host bus adapters, software drivers and cabling is assumed.

Supports 2K, Dual Link HD, Single Link HD, SD:

- G-Technology, Inc. GSPEED-XL (4Gb Fibre Channel)
  Unit must be fully populated and with a minimum 512MB cache per controller.
- InforTrend EonStor A16F-G2422 (4Gb Fibre Channel)
  Unit must be fully populated and with a minimum 512MB cache per controller.
- Any drive array with comparable specifications to the above examples; 16 or more SATA drives with 4Gb fibre channel connectivity to host and 512MB cache per controller.

Storage capacity

No matter which storage system you choose, pick one that can scale to meet your needs over time. Ideally, you should be able to increase storage capacity or switch to a RAID level offering increased data protection in the future. Balance current and future storage needs with your budget and choose accordingly.

Note: All of the following numbers are approximations based on 2 channels of 48kHz audio. More audio channels can increase data rates. AJA also provides a freeware application called the AJA DataCalc that can be used to help determine the amount of storage space and bandwidth requirements needed for a selected format, frame rate, audio setting and compression. The AJA DataCalc application is also included with version 3.3 and higher of the KONA driver and can be found in the AJA Utilities folder which installs in the Applications folder of the Mac OS. The AJA DataCalc application can also be downloaded from the AJA website and used on any OSX computer.

FORMAT	Data Rate in MB/sec	Storage Requirement in GB/Hour
SD Formats		
10-bit 4:2:2 SD (NTSC/PAL)	28	101
8-bit 4:2:2 SD (NTSC/PAL)	21	76
DV50(NTSC/PAL)	7	27
DV25(NTSC/PAL)	3.6	14
Photo JPEG SD (NTSC/PAL)	2.5	9
HD Formats		
10-bit 4:2:2 1080i 59.94Hz/29.97fps	166	597
8-bit 4:2:2 1080i 59.94Hz/29.97fps	124	448
10-bit 4:2:2 1080i 50Hz/25fps	138	498
8-bit 4:2:2 1080i 50Hz/25fps	104	373
10-bit 4:2:2 1080PsF 23.98Hz/fps	133	478
8-bit 4:2:2 1080PsF 23.98Hz/fps	100	358
10-bit 4:2:2 720P 59.94Hz or fps	133	478
8-bit 4:2:2 720P 59.94Hz or fps	100	358
10-bit 4:4:4 1080PsF 23.98Hz/fps	199	717
10-bit 4:4:4 1080PsF 25Hz/fps	207	746
8-bit 4:2:2 1080i 59.94Hz/29.97fps	124	448
8-bit 4:2:2 1080i 50Hz/25fps	104	373
8-bit 4:2:2 1080PsF 23.98Hz/fps	100	358
8-bit 4:2:2 720P 59.94Hz or fps	100	358
2K Formats		
10-bit 4:4:4 2048x1556PsF 23.98fps	306	1100
10-bit 4:4:4 2048x1080PsF 23.98fps	212	764
MB = MegaBytes *GB = GigaBytes*		

Cable Connections

When KONA 3G is installed in an Apple desktop computer, it connects to the outside world via either the standard cable set supplied with the board, or the optional K3G-Box Breakout Box (using the cables and directions supplied with it). Use the cables or the optional Breakout Box to connect your VTR, input and output sources, and external reference video (genlock).

Using the Standard Cables

KONA 3G offers you complete I/O connectivity choices. One cable provides AES/EBU digital BNC connections and analog monitoring video connections. The other cable has 4 mini-connectors on one end, and 4 BNCs on the other, and provides SDI connections for both single link and

dual-link SD/HD SDI/HSDL connections. Cable connections are marked on both the KONA 3G card endplate and on the cable connectors for easy identification.

Using The Breakout Box

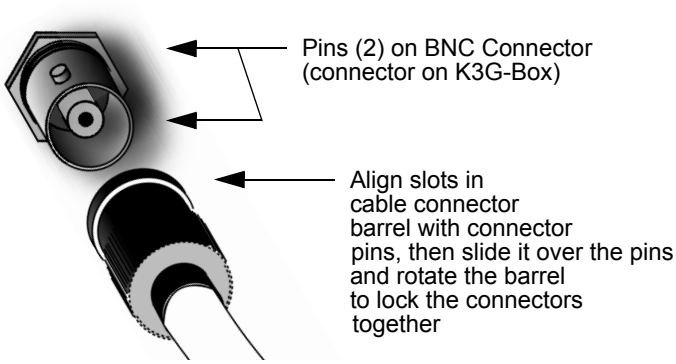
The KONA 3G Breakout Box attaches to the KONA 3G card via cables supplied with it that attach to the back of the Box.

For additional functionality, the K3G-Box Breakout Box provides some features not present in the standard break-out cables: 16 BNC AES output, 2 channel RCA analog audio monitoring, and looping BNC Genlock reference connectors.

About BNC and Mini-Connectors

Although most video professionals are used to BNC connectors, you may not have seen them if you've been using primarily prosumer video equipment. BNC connectors ensure a positive connection by the act of locking the connectors together via pins in one connector that fit into slots in the corresponding connector.

To make a BNC connection, slide the cable connector over the panel connector and then when seated, rotate the barrel of the cable connector 90° clockwise until the connectors are locked together. When properly locked, the cable cannot accidentally be pulled out.

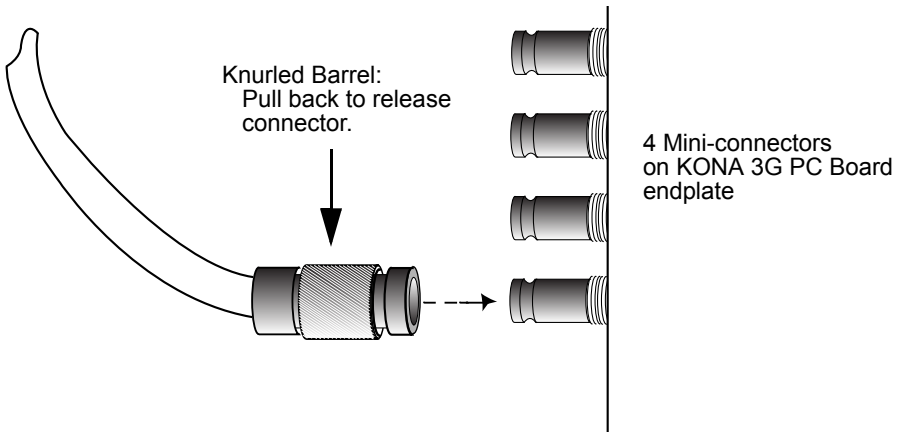


The four mini-connectors found on the KONA 3G endplate are not common to most video equipment but offer small size, ease-of-use, and high reliability. (The connectors are also called “mini-BNCs” and “1.0/2.3 Connectors”.)

To make a connection with these connectors simply push the cable mini-connector onto the endplate mini-connector. It will lock in place when fully seated.

To remove a mini-connector, just grasp the knurled barrel on the connector and pull the connector off.

Note: Do not try to remove the mini-connector by pulling on the cable itself as this action will not remove the connector—but can stress the cable.



Connector Descriptions—Cables and K3G-Box

Connectors on the standard cable set are labelled as to their function for easy installation and maintenance. Similarly, connectors on the optional Breakout Box are also labelled.

8-Channel Digital AES/EBU Audio Inputs And Outputs

When using the standard cables, BNC connections are provided for 8 digital AES/EBU audio input/output.

The optional Breakout Box provides 16 BNC audio connections on the front panel.

Analog 2 Channel Unbalanced Audio (Breakout Box only)

On the optional K3G-Box are two analog output connectors, one for each channel. These connectors are RCA-style phono jacks.

RS422 Machine Control

A DB9 connector provides connection to VTRs, digital disk recorders, and other devices using RS422 device protocol. For the breakout cable the connection is male and for the breakout box the connector is female. (Connector pinout is listed in Appendix A: Specifications.)

SDI Input and Outputs

In Standard Mode, mini-connectors are provided for two SDI inputs and two SDI outputs for single or dual-link. A cable with four Mini-connectors on one end and four BNCs on the other end is provided for connecting equipment to the SDI inputs and outputs. This cable is also used to interconnect between the KONA 3G board to the optional K3-Breakout Box.

KONA 3G offers 4 video outputs in SD and HD—2 SDI outputs that are used for both high-definition and standard-definition (SD/HD-SDI), and an analog video output (configuration of this three BNC cluster is discussed later with regards to component, composite and Y/C). Each of the three outputs is independently switchable between HD and SD. For example, if you are working in HD, you can have simultaneous HD-SDI, SD-SDI, and HD-component analog output. A fourth output via HDMI 4.1a is also provided.

When the KONA 3G is reconfigured for 4K Mode and a 4K format is selected, all four of the mini BNCs are used as outputs for each of the 4K playout quadrants. There are no SDI inputs available in 4K formats. If a format of 2K or less is selected the normal SDI inputs are available (see *"Using 4K Mode" on page 88* for more information on 4K output mapping).

SDI inputs and outputs support video as well as 16-channels of embedded 24-bit digital audio. Use SDI wherever possible for the best quality 10-bit uncompressed video input, capture and output. If peripheral equipment has a variety of inputs/outputs, look to see if it has SDI I/O, and

use it where possible. Most high-end professional broadcast equipment supports SDI (VTRs, cameras, media storage servers, etc.).

Note: In the past manufacturers have used separate I/O connections for standard- and high-definition SDI because the circuits were different. On KONA 3G we use the same connectors for both HD and SD-SDI (both input and output) due to our dual-rate chipset which supports both HD and SD.

HDMI 1.4a Monitor Output

KONA 3G offers an HDMI 1.4a output for monitoring in HDMI or DVI protocols (use DVI if you're outputting to a DVI monitor). The output also supports Stereo 3D output in either Side-by-Side or Top-Bottom (Stacked) output of left-eye and right-eye signals.

Analog Monitor Out (Component HD or SD or SD Composite + Y/C)

KONA 3G features 12-bit component video output for both HD and SD. The analog component output can be configured in a variety of ways; as a component, composite or Y/C signal. This flexibility allows, for example, the use of an inexpensive analog input-only monitor for both HD or SD viewing. Since the three BNC connectors share component, composite and Y/C functions, output of component is exclusive while composite and Y/C can be output simultaneously. For Y/C monitoring an adapter cable from dual BNC for Y/C to S-Video mini-DIN style connector is required. For analog monitoring, a component video signal is generally regarded as higher quality for monitoring than a composite signal.

A Note About YPbPr—Component Video, or YPbPr, has been given several names over time. YUV, Y/R-Y/B-Y, and YCbCr, are just some examples. Although these various formats have some differences in levels, they are all basically the same. KONA 3G uses the modern YPbPr terminology exclusively. KONA 3G supports three different types of YPbPr: SMPTE/EBU N10, Betacam (NTSC), and Betacam (NTSC Japan). These three formats differ in level only and are configured in the AJA Control Panel.

A Note About RGB—Although RGB is used less in today's video systems, KONA 3G supports it for A/V Monitor output. However, because KONA 3G's (and SMPTE SDI's) native format is YPbPr, AJA recommends the use of YPbPr whenever possible for analog monitoring. Although component video monitors often have RGB inputs, it's better to use YPbPr when the monitor supports it. The YPbPr format provides "headroom" for "superwhite" and "superblack"—and these video levels *will be clipped* when transcoding to RGB. Also, the RGB/YPbPr transcoding involves a level translation that results in mathematical round-off error. RGB can be configured in the AJA Control Panel.

HDMI and Analog Output in 4K Format

When the KONA 3G is in 4K Mode with a 4K format selected, the HDMI and Analog Outputs can be selected to display one of the four 4K picture quadrants for output. A quadrant selection menu is provided in their respective AJA Control Panel tabs. (refer to *"Using 4K Mode" on page 88*).

Reference Video

A single BNC connector is standard on the KONA 3G cable (self terminating). Two BNC connectors are standard on the breakout box (these provide loop through: if ref is not looped out, a 75 ohm terminator should be used for the loop out connector). Reference allows you to synchronize KONA 3G outputs to your house analog reference video signal (or black burst). If you have a sync generator or central piece of video equipment to use for synchronizing other video equipment in your studio, then connect its analog composite output to the KONA 3G reference input. When KONA 3G outputs video it uses this reference signal to lock to. When connecting a reference video source, the locking signal should be the same format in Hz (1080i29.97, 625i25, etc.) as the Primary format selected in the AJA Control Panel. It is possible in some circumstances to use an alternate format video signal as long as the basic frame rate is compatible (for example, using a 525i29.97 genlock signal to lock a system running 1080i29.97)—if the Hz coincide.

In This Manual

Chapter 1 is the introduction you're reading, listing features, box contents, and system requirements.

Chapter 2 gets you started with using KONA 3G in a typical video environment. Typical workflows for SD, HD, Dual Link HD, and 2K are discussed.

Chapter 3 provides complete instructions for installing and configuring the AJA KONA 3G card. The user is guided through unpacking, installing the card into a MacPro tower, installing KONA 3G Mac Software, cabling the system and then getting it up and running. Important configuration information is also provided on video settings and use of genlock/external reference.

Chapter 4 discusses operational aspects of KONA 3G when used with Final Cut Pro.

Chapter 5 discusses troubleshooting problems with your system and what to do when there's a problem you can't solve.

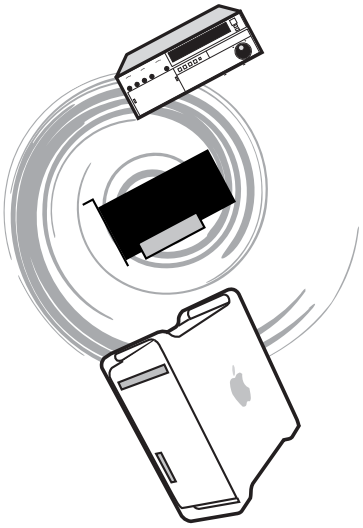
Appendix A presents a list of technical specifications for the product.

Appendix B gives a glossary of technical terms and acronyms used in the manual.

Appendix C discusses the operational aspects of using 2K workflows with KONA 3G.

The remainder of the manual consists of appendices listing specifications and an index section to help you rapidly find topics in the manual.

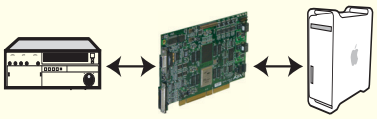
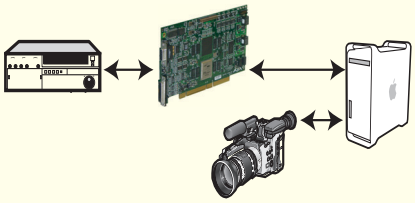
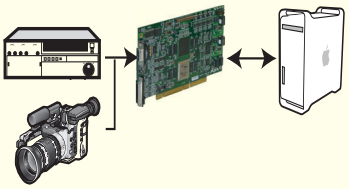
Chapter 2: Getting Started



KONA 3G And Your Workflow

There are a lot of ways to think about audio/video workflows. Your setup might be categorized as corporate video, professional broadcast, or desktop video. Or the workflow might be categorized by the type of equipment used rather than the nature of work produced—many systems these days are a mixture of equipment from high-end professional to desktop video. This chapter tries to show how Final Cut Pro and KONA 3G can help fit into whatever workflow you currently have and make it more efficient.

A Workflow Scenarios diagram on the following page shows types of equipment, sorted by VTR source, and the type of workflow attributes KONA 3G applications support. After the diagram, we also discuss some typical applications.

Source Deck Type(s)		Workflow Attributes	Applications
Digitaal SD or HD Examples: Digibeta, DV50, DVCPROHD, HDCAM, and DVcam		KONA 3G captures and outputs SDI video (SD or HD) with embedded audio. Use high-quality AES/EBU and/or embedded 8-channel audio output.	Pro Broadcast Corporate/Industrial On-site Editing
Digital capture via Firewire with Output via AJA KONA 3G Example: HDV		Using standard desktop video techniques, video/audio is captured directly from a camcorder or deck. KONA 3G is used for playing back captured media and editing/mastering to tape or DVD using Final Cut Pro and other tools such as After Effects, Combustion, Apple Motion, etc.	Desktop Video Corporate/Industrial On-site Editing Pro Broadcast
Without even using a deck; use the video monitor as a second Mac monitor. The KONA 3G desktop lets you drag graphics from programs like Adobe Photoshop from the computer display to the video monitor. You paint full frame and live onto a broadcast monitor. Output virtually anything to video—ideal for animators and compositors.		Using Final Cut Pro, work with a wide range of old and new SD and HD sources, including dual-rate and dual-link or single-link 3G and then also use desktop graphics and video software for creative power and flexibility.	Post-production Animation Compositing

Workflow Scenarios

Understanding Typical Workflows

KONA 3G and Final Cut Pro allow more workflow flexibility than ever before in post production. Users can select a variety of formats, frame rates and codecs for capture and editorial manipulation. KONA 3G hardware has a full array of connectors for interfacing with VTRs, DDRs and other devices—with all outputs active simultaneously. Capture can range from compressed DV to uncompressed dual-link or 3G HD and even 2K. Media can be stored on disk as:

- offline quality at low bit rates
- on-line quality at moderate bit rates
- or with the highest quality 8- or 10-bit uncompressed quality.

As quality and codecs improve, the lines between offline and online are blurring. For example, with the development of the DVCPRO HD codec, native HD editing in the codec became possible, providing very high quality results (true HD editing) at very low data rates, in some cases lower than 6 MB/sec. Compare this to 100MB/sec and higher for uncompressed HD formats, and you can immediately see the benefits.

Following are summaries of the most common workflows, listing data rates and relative quality levels. Some workflows require a RAID array and some will work using the host Apple computer's internal system drive—it's noted where this is supported in the following discussions.

PhotoJPEG

Data rate: approximately 1-3 MB/second (megabyte per second) standard definition or high definition—supported by internal system drive

Quality: Very Good

The PhotoJPEG codec offers an excellent compressed media choice for near on-line quality at low data rates. PhotoJPEG can use the full-raster at 4:2:2 sampling. Final Cut Pro allows you to adjust the quality using a slider. To be able to effectively encode to PhotoJPEG when capturing HD, the quality slider should not be set past 35% for HD. The quality slider can be set higher for SD formats. KONA 3G allows for PhotoJPEG monitoring and/or output in both SD and HD. KONA 3G can capture from almost any HD or SD input, directly to PhotoJPEG media.

DV (DV25)

Data rate: 3+ MB/second standard definition only—supported by internal system drive

Quality: Good

DV is commonly input to an Apple computer via FireWire. KONA 3G can capture directly to DV compressed media from an uncompressed SDI source. For devices that may not have FireWire (IEEE1394 or i.Link) connections, this allows the user to capture to this low data rate, yet good quality codec. While DV does offer good quality, it has lower chroma resolution when compared to DV50, JPEG, or uncompressed. The KONA 3G can be used to convert DV projects to uncompressed-in real time-for monitoring and/or output even if you haven't captured the footage using the KONA 3G.

DV50

Data rate: 6+ MB/second standard definition only—supported by internal system drive

Quality: Very Good

Like DV25, Final Cut Pro also supports the Panasonic DV50 standard definition codec. DV50 is a 4:2:2 compressed format and therefore has higher chroma resolution when compared to DV25. Also like DV25, you can use KONA 3G to convert DV50 projects to uncompressed—in real time—for monitoring and/or output. KONA 3G can capture from its SDI input, directly to DV50 compression.

DVCPRO HD

Data rate: 6 to 14 MB/second high definition—supported by internal system drive

Quality: Excellent

KONA 3G has hardware support that allows capture from HD-SDI to the DVCPRO HD codec. KONA 3G's hardware also takes a portion of the DVCPRO HD codec processing load off the CPU, allowing more computer processor time for Dynamic RT effects in Final Cut Pro.

HDV

Data rate: 2+ MB/second high definition—supported by internal system drive

Quality: Very Good to Excellent

While the structure of HDV (Long GOP MPEG2) makes it nearly impossible to ingest in realtime, you can use KONA 3G to convert HDV projects to uncompressed-in real time on playback-for monitoring and/or output.

Uncompressed 8-bit 4:2:2 (SD or HD)

Data rate: 21 MB/second for standard definition or 100 to 125 MB/sec for high definition—external storage recommended

Quality: Excellent, broadcast quality

Capturing in uncompressed results in clearly defined video, at full raster size and 4:2:2 chroma sampling. Using uncompressed maintains high quality from capture all the way through effects rendering. Final Cut Pro supports RT with uncompressed media using RT Extreme. KONA 3G supports capture of uncompressed through its SDI input. Uncompressed media can output via all of the KONA 3G outputs simultaneously.

Uncompressed 10-bit 4:2:2

Data rate: 28 MB/second standard definition, or 133-166 MB/second high definition

Quality: Excellent, broadcast quality

Offering all the benefits noted previously for 8-bit uncompressed, 10-bit additionally offers higher color specificity for compositing and color correction. With Uncompressed 10-bit 4:2:2 media, video quality is second to none-at any price point - for non-linear post production. For more information on this subject, please see the topic at the end of Chapter 4: Installation and Configuration, titled "Using 8-bit Versus 10-bit Video."

AJA KONA10-bit Log RGB and RGB Codecs

Data rate: 200 to 300+ MB/second high definition and 2K; 4K 200 to 850MB/second

Quality: Excellent, highest quality available

Offering all the benefits noted previously for 10-bit uncompressed 4:2:2, Dual Link 4:4:4 video using 2 HD-SDI channels and 3G 4:4:4 using one SDI channel provide full-color resolution and luminance. The term "4:4:4" refers to the ratio of sampling frequencies used to define the RGB components of a video signal. In this ratio, the red, green and blue components receive equal specificity, providing increased quality over 4:2:2 where chroma sub-sampling occurs. 4:4:4 is particularly useful for film related digital intermediate work as well as the highest level compositing and color correction.

AJA KONA10-bit Log RGB and RGB Codecs as related to a 2K Workflow

Data rate: For 2048x1556 2K:
• When seen as a QuickTime movie at 23.98fps with a raster of 2048x1556, the data rate is 300MB/second (approximately).

• When seen as a single frame DPX file with a 2048x1556 raster, the size is roughly 12+MB/frame.

• 2K uncompressed media necessitates the use of high-performance SCSI or Fibre Channel drive arrays.

Quality: Excellent, with additional cost and labor savings over traditional 2K workflows.

Apple ProRes 422 and Apple ProRes 422 HQ (SD or HD)

Data rate: Approximately 18 MB/second ProRes 422, Approximately 31 MB/second ProRes 422 HQ— supported by internal system drive or attached storage

Quality: Excellent, broadcast quality

Captured media is virtually indistinguishable from pristine uncompressed sources. Better yet, ProRes maintains the quality during editing, surviving multiple encoding/decoding generations without degradation. It was designed by Apple for editing, rather than as a transmission/distribution codec as are most popular codecs. Some of the advantages include:

• Full-size 1920-by-1080 and 1280-by-720 HD resolutions.

• Full-size 720-by-486 and 720-by-576 SD resolutions.

• 4:2:2 chroma sampling. Provides precise compositing and blending at sharp saturated-color boundaries.

• 10-bit sample depth. Preserves subtle gradients of 10-bit sources (perfect for green-screen compositing, graphics or color correction) with no visible banding artifacts.

• One frame-only encoding. Ensures consistent quality in every frame and no artifacts from complex motion.

• Variable bit-rate (VBR) encoding. “Smart” encoding analyzes the image and allocates more bits to complex frames.

• Low data rate requirements make for more storage options and require less drive space to store high-quality video.

Workflow General Notes

The previously discussed codecs (DVCPRO HD, PhotoJPEG, DVCPRO 50, etc.) are used in different ways based on project characteristics. Some codecs create very high quality offline files at low data rates for projects that will ultimately be delivered as uncompressed via an offline/online process; other projects may use these compressed formats to create final masters. AJA provides Final Cut Pro Easy Setups for settings that can be used in a “capture once-use in many steps” type process. For example, you might use offline files for:

• editing digital dailies for review from a digital projector

• viewing location footage

• editorial performed on laptops

• creating screening cuts of the project for approval and audience testing

all from one QuickTime file using the DVCPro HD codec.

Mixing and Matching Formats in Final Cut

In Final Cut Pro, the best editorial results come from working with one format-per-timeline consistently. For example, if you capture HDV files and then capture 10-bit uncompressed files, you'll have to rerender one or the other when using the two types on the same Final Cut sequence (the timeline where media is edited into a project). You could even capture 8-bit uncompressed and DV, and then place them both on a PhotoJPEG timeline and end up having to render them both.

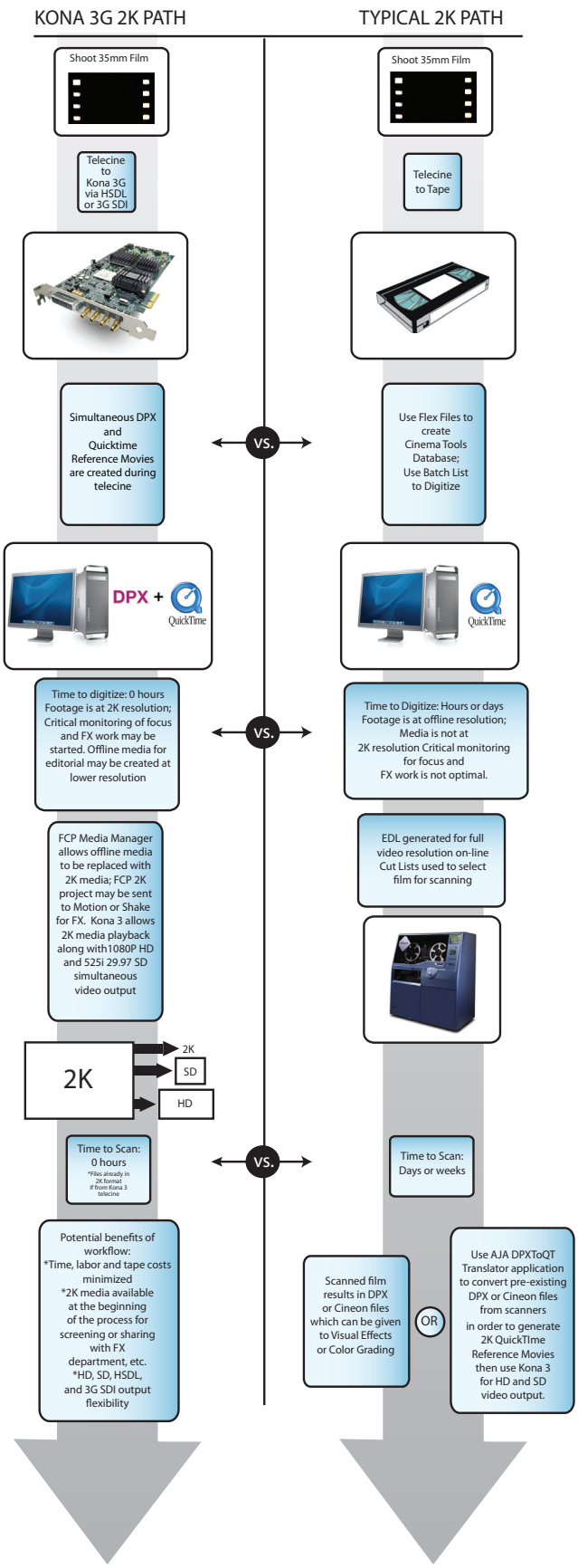
Therefore, it makes sense to capture media into your system at the highest quality you plan to use in Final Cut to eliminate rerendering and ensure the best results for mastering. A well thought out online/offline workflow should be mapped out before starting a project. The KONA 3G card provides a solution by allowing users to capture to a common codec easily with its hardware-based upconversion, downconversion and crossconversion capabilities.

For example, if a 720P 59.94 DVCProHD master is desired, and the source material is standard definition Digital Betacam tapes at 29.97fps, DVCProHD tapes at 59.94fps and HDCam tapes at 29.97fps, all of these tapes can be digitized to the common codec of DVCProHD at 720P 59.94.

2K Workflows

For large facilities, KONA 3G's 2K support allows ingest of 2K media via HSDL (high speed data link), using SDI connections, from 2K telecine machines or DDRs into the KONA 3G as 2K sequential DPX files and 2K QuickTime reference movies simultaneously. 2K playout via HSDL or 3G SDI further enhances the flexibility of KONA 3G to work with other 2K equipment such as DDRs and projectors that work with 2K. For cost-conscientious facilities, playback of 2K to HD 24P supported monitors helps lower the price barrier for working with, and especially viewing, 2K material.

When comparing the traditional 2K path and a potential KONA 3G 2K path, the potential for cost and labor savings becomes apparent. By avoiding the telecine to tape and instead going straight to disk with media, the KONA 3G 2K path can immediately save users the cost of tape stock and the time associated with then digitizing these tapes into a non-linear editor. By generating 2K DPX files during the digitize phase, the
Kona 3G also moves a portion of the 2K process up to the beginning - instead of the end - of the post production process; this means that shots intended for visual effects work could be given to visual effects artists at full resolution at the beginning of the process instead of waiting until near the end of the process. The flexibility of an offline using Final Cut Pro leveraged against the power of QuickTime and Final Cut Pro's media management tools, allows easy access to 2K resolution files and even potential 2K online possibilities.


KONA 3G 2K PATH
TYPICAL 2K PATH
Shoot 35mm Film
Shoot 35mm Film
Telecine to Kona 3G via HSDL or 3G SDI
Telecine to Tape
Simultaneous DPX and Quicktime Reference Movies are created during telecine
VS.
Use Flex Files to create Cinema Tools Database; Use Batch List to Digitize
DPX +
QuickTime
QuickTime
Time to digitize: 0 hours Footage is at 2K resolution; Critical monitoring of focus and FX work may be started. Offline media for editorial may be created at lower resolution
VS.
Time to Digitize: Hours or days Footage is at offline resolution; Media is not at 2K resolution Critical monitoring for focus and FX work is not optimal.
FCP Media Manager allows offline media to be replaced with 2K media; FCP 2K project may be sent to Motion or Shake for FX. Kona 3 allows 2K media playback along with 1080P HD and 525i 29.97 SD simultaneous video output
EDL generated for full video resolution on-line Cut Lists used to select film for scanning
2K
2K
SD
HD
Time to Scan: 0 hours
*Files already in 2K format if from Kona 3 telecine
VS.
Time to Scan: Days or weeks
Potential benefits of workflow: *Time, labor and tape costs minimized *2K media available at the beginning of the process for screening or sharing with FX department, etc. *HD, SD, HSDL, and 3G SDI output flexibility
Scanned film results in DPX or Cineon files which can be given to Visual Effects or Color Grading
OR
Use AJA DPXToQT Translator application to convert pre-existing DPX or Cineon files from scanners in order to generate 2K QuickTIme Reference Movies then use Kona 3 for HD and SD video output.

KONA 3G Workflow for 2K Compared to Traditional 2K Workflow

Important Note about 2K: Operational procedures and information for working with 2K workflows are presented in Appendix C at the back of this manual. 2K workflows are unique and require the use of KONA's VTR Exchange and Final Cut Pro, in conjunction with the 2K Crop features of the AJA Control Panel (discussed in Chapter 4-2K Crop Screen). To begin working with 2K, please read Appendix C.

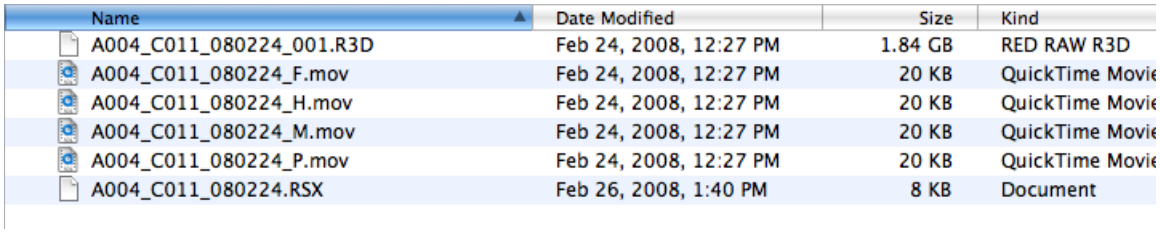
For more information on 2K and the use of the AJA KONA 3G card, users should download the AJA whitepapers on this specific topic on our website (www.aja.com).

AJA KONA 3G Workflow Support For RED

When working with footage produced by the RED One camera, there are many possible workflows due to the flexibility of the camera and the hi-resolution images it produces. Outlined in this section are three possible workflows that Final Cut Pro and AJA KONA 3G users might elect to implement.

Workflow using RED proxy files

RED recordings produce. R3D files as well as proxy files. These proxy files (which are essentially QuickTime reference movies) are denoted with an underscore and then a letter designation that denotes their quality, such as A004_C011_080224_H.mov; this file represents a half resolution proxy of the source 4K file. Half resolution proxy files reside with the source.R3D files and are at a 2048x1024 frame size in the REDCODE codec. These half resolution 2K files can be imported into Final Cut Pro if the RED QuickTime codec has been installed on the system. For the RED QuickTime codec, visit www.red.com/support.



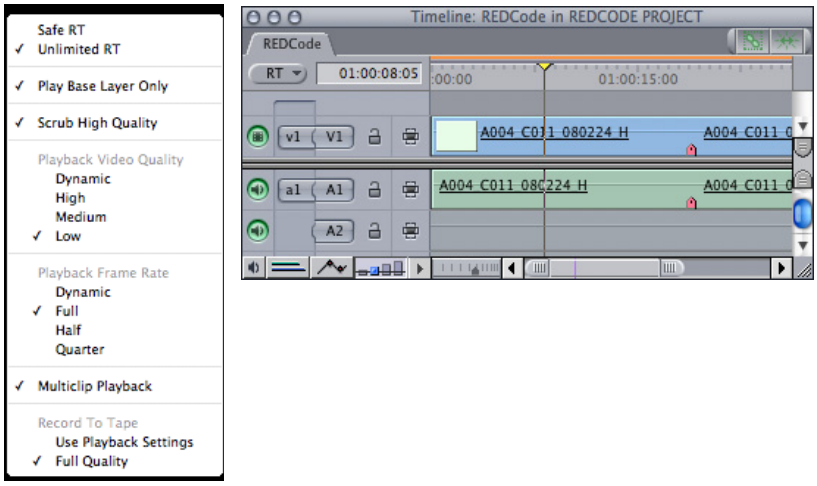
Name	Date Modified	Size	Kind
A004_C011_080224_001.R3D	Feb 24, 2008, 12:27 PM	1.84 GB	RED RAW R3D
A004_C011_080224_F.mov	Feb 24, 2008, 12:27 PM	20 KB	QuickTime Movie
A004_C011_080224_H.mov	Feb 24, 2008, 12:27 PM	20 KB	QuickTime Movie
A004_C011_080224_M.mov	Feb 24, 2008, 12:27 PM	20 KB	QuickTime Movie
A004_C011_080224_P.mov	Feb 24, 2008, 12:27 PM	20 KB	QuickTime Movie
A004_C011_080224.RSX	Feb 26, 2008, 1:40 PM	8 KB	Document

Red Files

Once proxy files are imported into Final Cut Pro, they can be used in a Final Cut Pro timeline. If the files are added to a new sequence, the sequence settings dialog prompt will appear. Users should select the “yes” button in the prompt so that the sequence is set appropriately. Since the proxy file is essentially a QuickTime reference movie based on the source.R3D wavelet compression file, it requires some processing overhead to playback seamlessly within Final Cut Pro and out of the KONA 3G video outputs.

For optimum playback results, the timeline RT settings should be switched to:

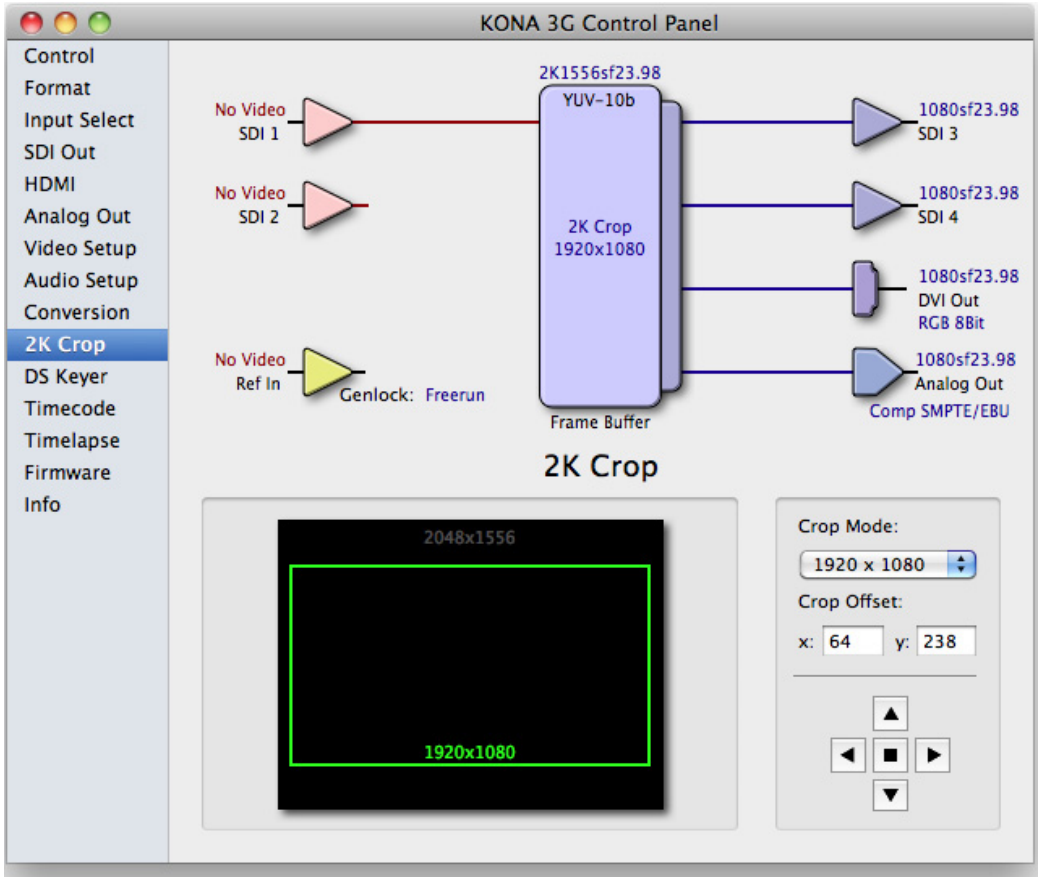
- Unlimited RT
- Playback Video Quality = Dynamic
- Playback Frame Rate = Full.



Dynamic RT settings for Timeline when working with REDCODE proxy files. Note Dynamic RT Unlimited denoted in Timeline by orange bar.

On a high performance 8-core Mac Pro, the playback should be realtime or close to realtime with these settings. Video playback can be routed through the KONA 3G outputs as either 1080psf23.98 10-bit (1920x1080) or as 2K that can be cropped to a 1080 output if desired.

This workflow is suitable for an offline editorial when conforming to the.R3D files or some other finishing method. These proxy files are assigned HD video values by default, resulting in a rec. 709 HD video color space with a gamma of 2.2.

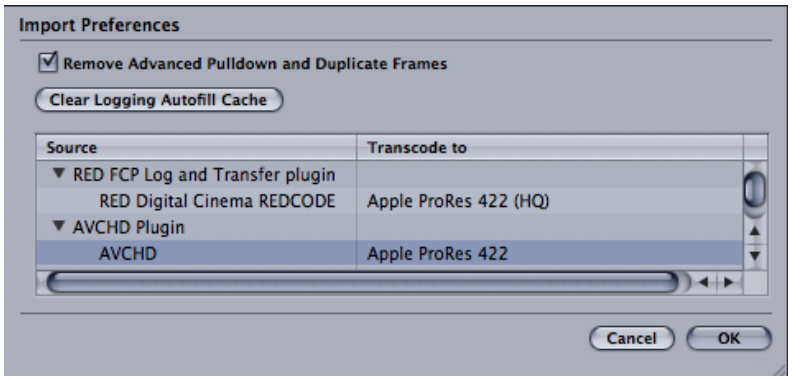


AJA Control Panel configured for 2K Crop

Final Cut Pro can also be set so that A/V Devices is configured to 1080PsF 23.98 10-bit. In this case, FCP will handle scaling the video for HD output.

Workflow using Apple ProRes 422 (HQ) media created via RED plugin for Final Cut Pro Log and Transfer

RED provides a plugin for the Log and Transfer feature within Final Cut Pro. This plugin can be obtained from www.red.com/support and can be used with Final Cut Pro version 6.0.3 or higher. The RED Log and Transfer plugin imports REDCODE clips and transcodes them to Apple ProRes 422 (HQ) at 2048x1024 and 23.98fps.



RED Log and Transfer transcoded clip Item Properties.

These files can be added to a Final Cut Pro sequence and operate in much the same way HD Apple ProRes 422 (HQ) media would. These files can be played back in realtime without the need to adjust the Dynamic RT settings for the sequence. The KONA 3G can be configured for video output of this media in either 2K or in HD at 1080psf 23.98.

This workflow is simple to use, but does require time to transcode the media from REDCODE to Apple ProRes 422 (HQ). However, Apple ProRes 422 (HQ) media can be used easily in the Final Cut Studio suite of applications. Like the REDCODE proxy files, these Apple ProRes 422 (HQ) files generated via the Log and Transfer process are assigned HD video values by default, resulting in a rec. 709 HD video color space with a gamma of 2.2.

Workflow using 2K DPX files created via REDCINE and wrapped as QuickTime files via the AJA DPXToQT Translator application

RED provides the REDCINE software for transcoding REDCODE media into a variety of formats and frame rates. REDCINE can be obtained from:

www.red.com/support

One option that is available within REDCINE is to convert the source media into sequential DPX files. The DPX files can be assigned a variety of frame sizes, including RED's own RED ONE 2K aspect ratio, which will result in 2048x1152 sized images. Note that a large number of applications may expect to work with DPX files at a more standard frame size, such as 2048x1556.

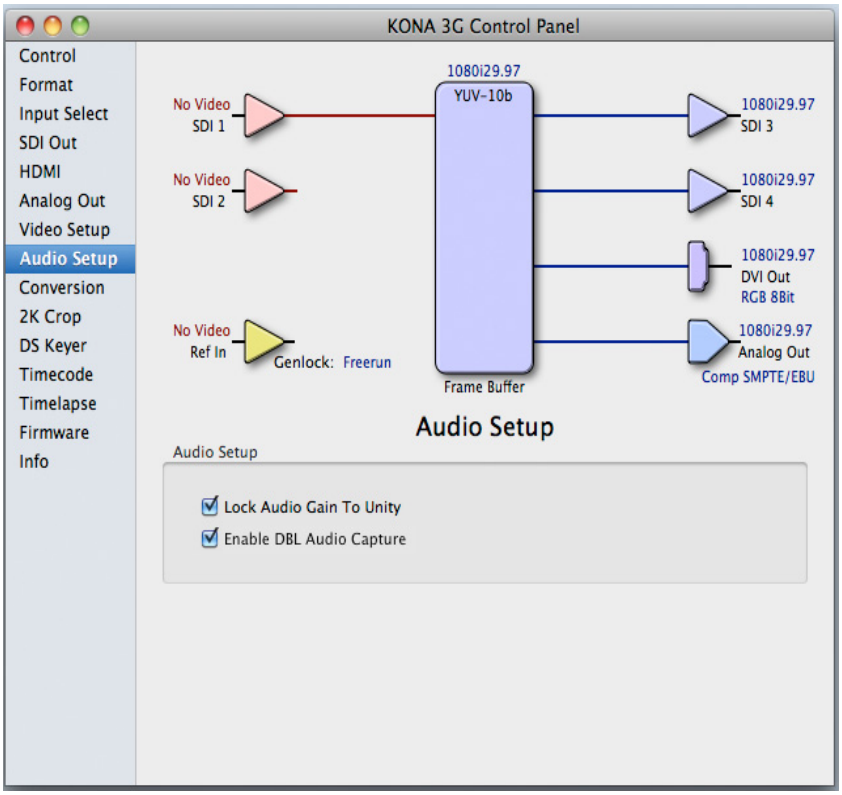
This frame size can also be produced in REDCINE and the image can be scaled to fit within this frame size via X and Y scale settings in the application. Also of note, REDCINE produced DPX files, unlike either the proxies or the files created via the Log and Transfer method, can be assigned 4:4:4 RGB values, not just Y,Pb,Pr 4:2:2 values. After producing the sequential DPX files via REDCINE, the files can be wrapped into QuickTime reference movies or self-contained QuickTime movies using the AJA DPXToQT Translator application.

This workflow is more complex than the other two outlined, but yields very high quality results. When interfacing with other applications, such as high-end color correction or visual effects applications, DPX files might be the desired file type. Note that the bandwidth requirements for the playback of sequential DPX files are much higher than the REDCODE proxy files or the Apple ProRes 422 (HQ) media. Appropriate computer and storage configurations need to be in place for realtime playback of 2K media.

Double Speed Transfer for KONA 3G and Sony HDCAM SR

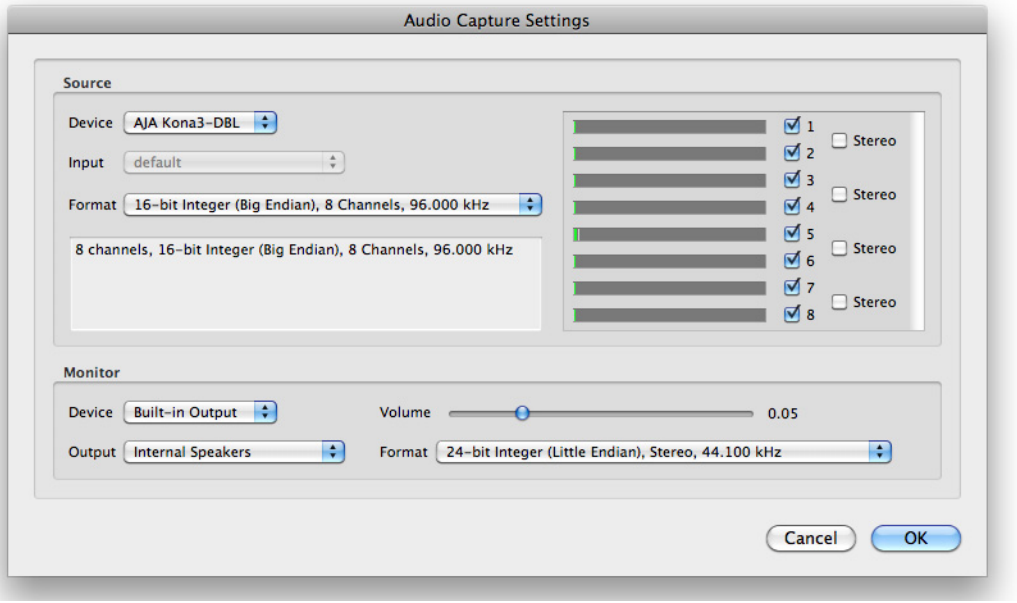
When used with properly equipped Sony HDCAM SR VTRs (such as the Sony SRW-5800), the KONA 3G can be configured to ingest material at double normal speed or "DBL" speed. There are some specific settings and software that need to be used for this. VTR Xchange v4.1 is required along with KONA 3G driver version 7.5 or later.

To properly ingest audio at double transfer speed, select the "Enable DBL Audio Capture" checkbox in the Setup tab of the AJA Control Panel application.



"Enable DBL Audio Capture" checkbox

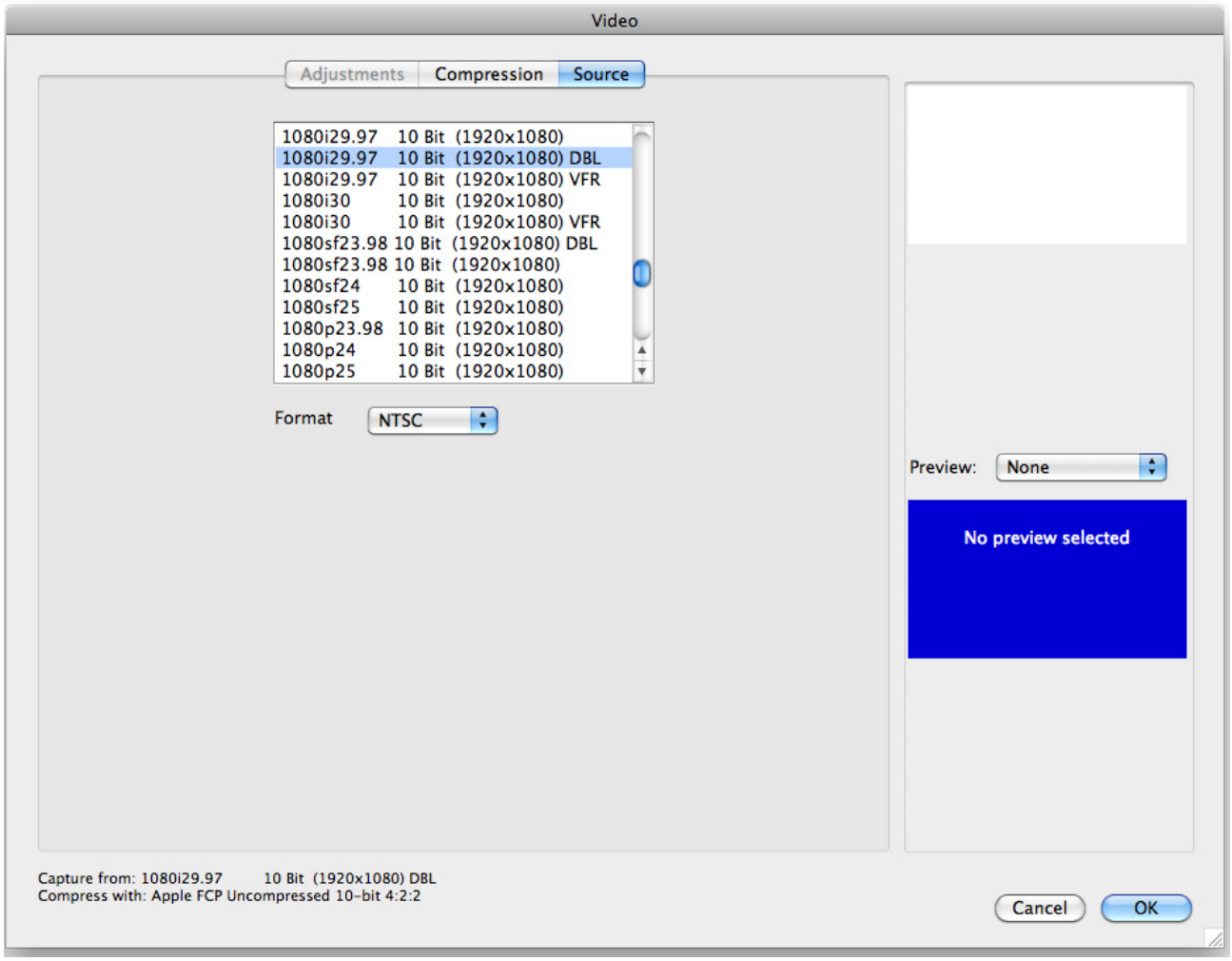
From within the AJA VTR Xchange application, select “AJA Kona3-DBL” from the Device pulldown in the application's Audio Capture Settings.



AJA VTR Xchange application, Audio Capture Settings

Note: When quitting the VTR Xchange application, the system may be left at 96kHz audio. This can be reset in the AJA Control Panel via the Inputs tab, Audio Sample Rate pulldown.

Select the appropriate video input format/frame rate for the double speed transfer via the VTR Xchange Video Settings. Notice that the source is appended with the “DBL” designation.



VTR Xchange Video Settings

Note: AJA recommends that if you are not working with any double speed ingest, you disable Double Transfer in the control panel. This prevents the driver from creating two audio engines and having them show up in multiple places.

Color Accurate Playback of ProRes4444 Video Using Final Cut Pro & KONA 3G

To perform color-accurate playback of ProRes4444 encoded video, it is helpful to know the original source format of the video data. ProRes4444 can come in two varieties:

- ProRes4444-RGB encoded video captured via RGB or RGB+Alpha.
- ProRes4444-YUV encoded video captured via Y,Cb,Cr.

For ProRes4444-RGB encoded material where 10bit RGB video output is selected, the user has two options:

Turn off the Final Cut Pro Effects Handling for ProRes 4444. To do this, go to "Final Cut Pro -> System Settings…" menu to open the dialog window. Choose the "Effects Handling" tab. Click the popup next to the "Apple ProRes 4444" item in the list and choose the "None" option.

You may then choose the 10-bit RGB video output setting. Playback will occur as expected, but Final Cut Pro RT effects will be disabled.

Or, for a second option, you can select the 10bit YUV video output selection instead of 10-bit RGB. This method allows the continued use of the Effect Handling within Final Cut Pro. To ensure color-accurate playback, open the AJA Control Panel application and select the "Codec" tab. Click the "Gamma" popup and choose the "Linear 1.8" setting.

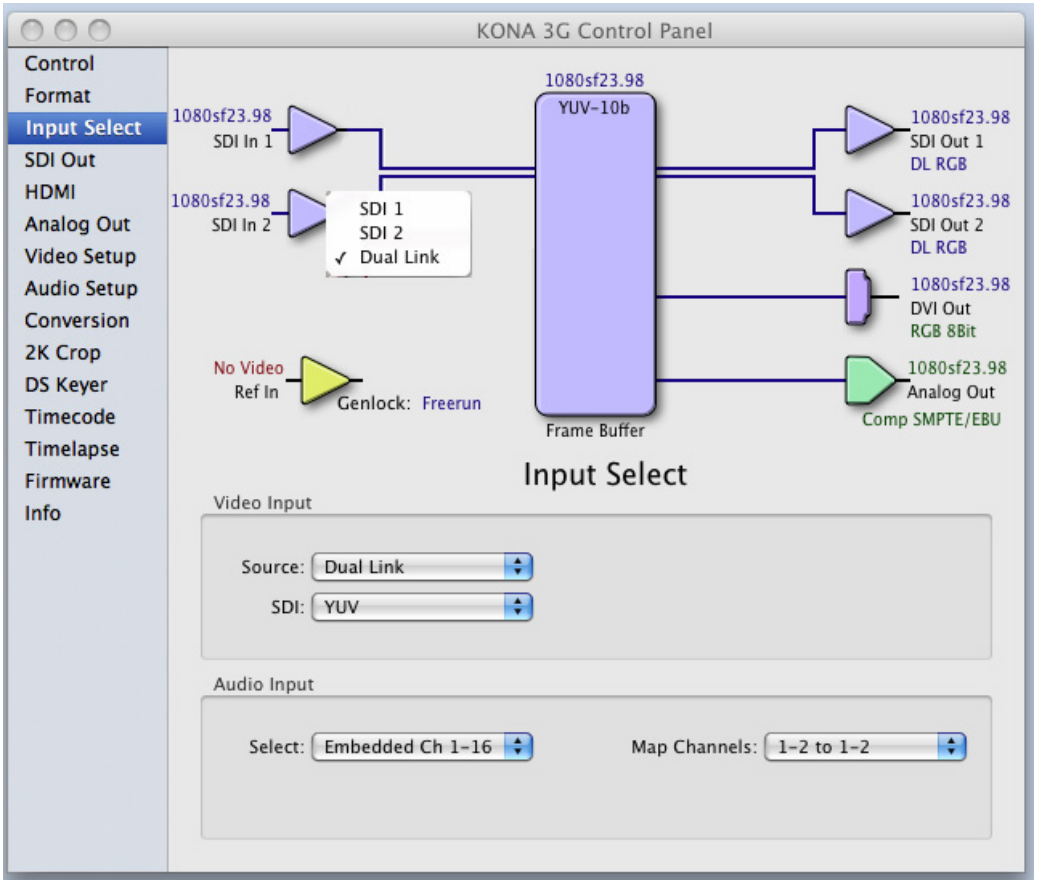
Important: Users should restore the Gamma setting back to "Auto" when playing back other video formats. Color-accurate RT playback of ProRes4444-YUV data can be obtained by simply using the 10-bit video output.

Stereoscopic 3D Workflows

The KONA 3G, using the Cineform Neo3D version 5.0.27 with codec version 6.7.8.514 or later, supports ingest and output of Stereoscopic 3D (discrete left eye/right eye) via SDI 1 and SDI 2 inputs and outputs and provides an HDMI 1.4a monitor output for Side-by-Side or Top-Bottom (Stacked) display.

Ingest

Dual Stream Input—Using the AJA Control Panel Input screen, you can select Stereo input for 3D. (Right-click pulldown menu shown.) In this configuration, the CineForm codec should be set to Stacked (Top-Bottom) mode Captured material will behave like stereo video that is paired and compressed inside the FirstLight application.



AJA Control Panel Setting for 3D Input

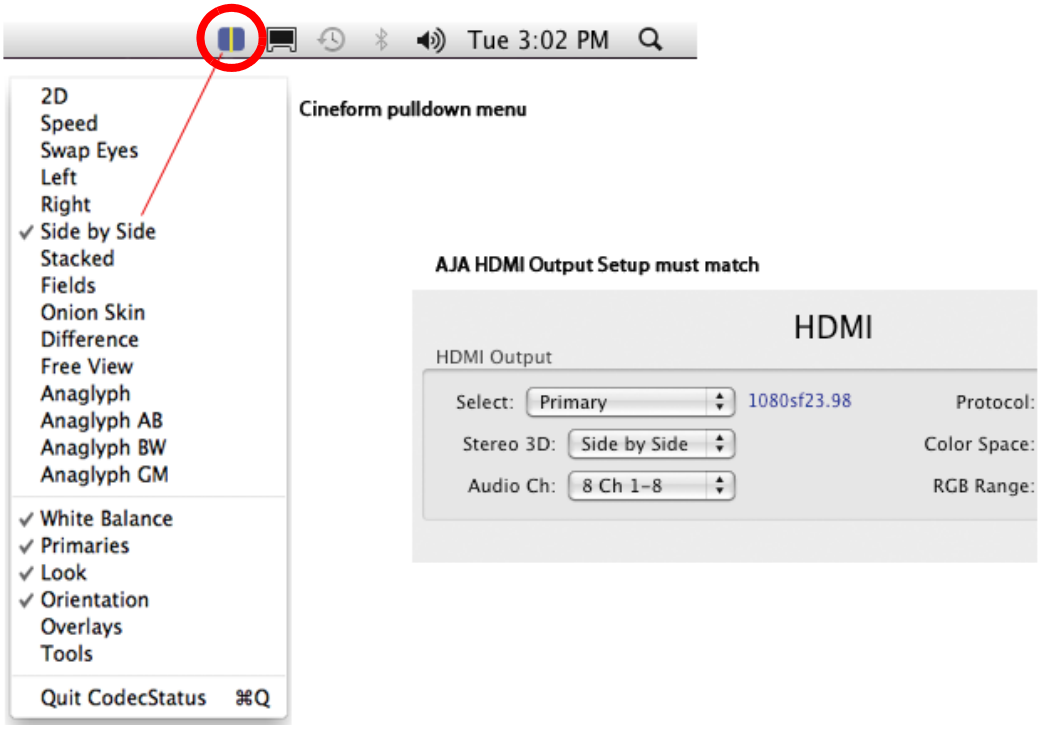
Muxed Single Stream Input—When capturing muxed stereo via a single SDI input, the captured material will be "burned-in" and any codec can be used. If you use the CineForm codec for "burned-in" muxed stereo, you will not be able to change playback modes using the CineForm system menu.

3D Stereo Format

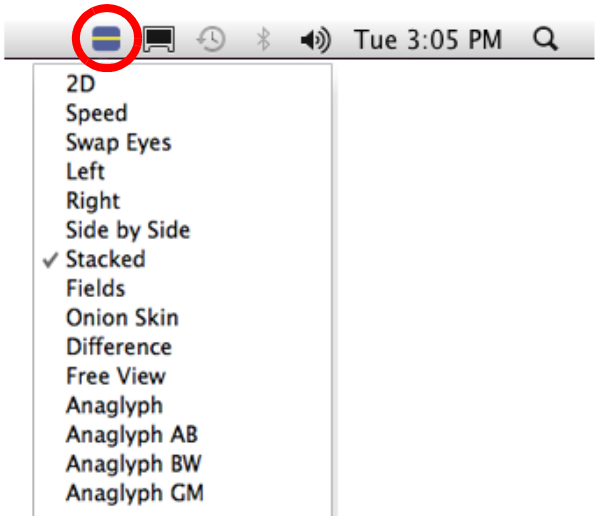
CineForm stereoscopic files, created using the CineForm FirstLight application or via AJA stereo capture can be configured for a variety of stereoscopic outputs. The most common formats for stereoscopic output are Side-By-Side or Top-Bottom (Stacked) formats.

With CineForm's Neo3D software installed, a Codec Status output pulldown appears in the Mac OSX Finder System menu where options like Side-by-Side may be selected.

Important: The CineForm stereo format selected must also be selected in the AJA HDMI Setup menu shown below.

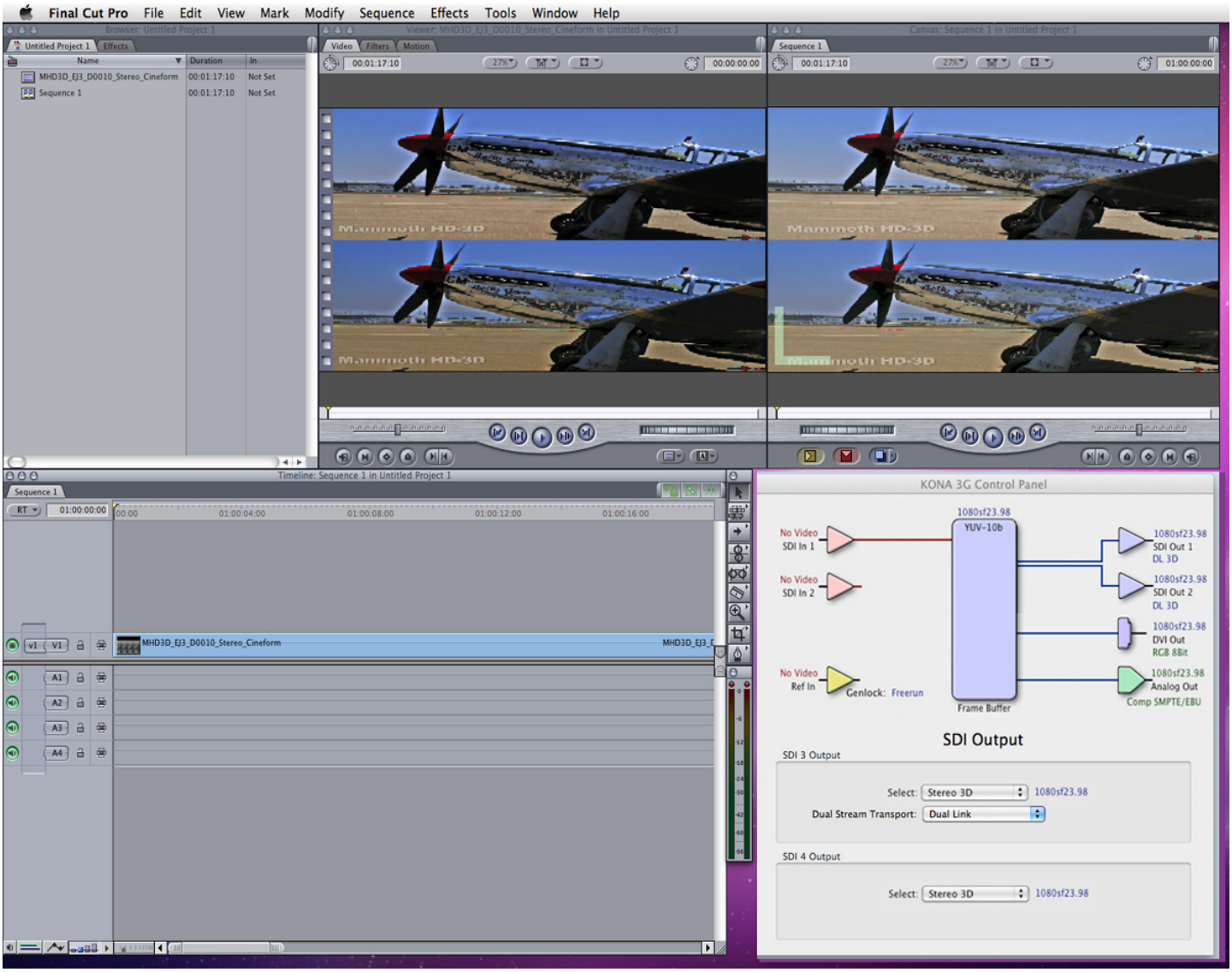


HDMI Stereo Output Format Selection and Side-by-Side Icon



Codec Pulldown with Top-Bottom (Stacked) Finder Icon

The material within an application, such as Final Cut Pro, will update to display the material in Side-by-Side or Top-Bottom (Stacked) form.

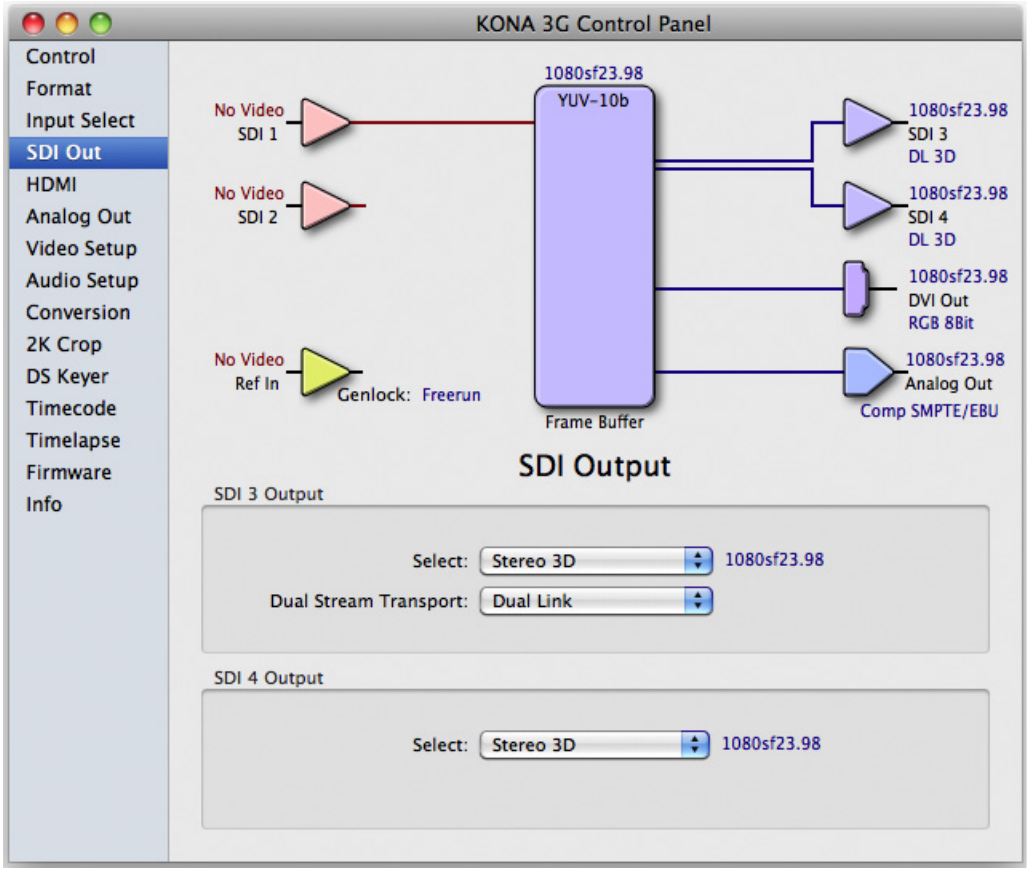

Final Cut Pro File Edit View Mark Modify Sequence Effects Tools Window Help
KONA 3G Control Panel
1080sf23.98
YUV-10b
No Video SDI In 1
No Video SDI In 2
No Video Ref In
Genlock: Freerun
Frame Buffer
1080sf23.98 SDI Out 1 DL 3D
1080sf23.98 SDI Out 2 DL 3D
1080sf23.98 DVI Out RGB 8Bit
1080sf23.98 Analog Out Comp SMPTE/EBU
SDI Output
SDI 3 Output
Select: Stereo 3D 1080sf23.98
Dual Stream Transport: Dual Link
SDI 4 Output
Select: Stereo 3D 1080sf23.98

Stereo Top-Bottom (Stacked) Display

3D Stereoscopic Output

Stereoscopic video (3D) can be output from the KONA 3G as either a muxed output via a single SDI output or via discrete left eye and right eye from the KONA 3G via the dual SDI outputs.

Dual Stream Output—To output a dual-stream full-raster stereo output the CineForm codec must be set to Stacked (Top-Bottom) mode. The AJA Control Panel output setting must be set to Stereo SDI for the discrete left eye output on SDI 1 and the discrete right eye output on SDI 2. Select the Stereo selection in the AJA Control Panel Digital Out tab.



Stereo Selection

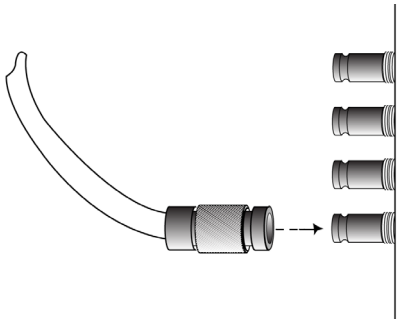
Single Stream Output—If you choose a solitary output signal, be sure the Stereo SDI out option is **NOT** selected in the AJA Control Panel.

HDMI Monitor

The monitor you use must support 3D formats. Not all monitors support 3D modes, setup, and auto detection. Check your monitor documentation for 3D capabilities.

Note: When Dual Stream 3D SDI output is selected, the HDMI output is Left Eye only.

Chapter 3: Installation



Installation Overview

The installation and set up of a KONA 3G is very simple. All of the steps of installation and configuration are documented in this chapter, summarized as follows:

1. Unpack and examine the contents of the shipping box
2. If not previously installed on your Mac, ensure that Final Cut Pro is installed as detailed in its user documentation. (If you do not intend to use the KONA card with Final Cut Pro but the AJA provided stand alone applications, FCP need not be installed.) Not only must Final Cut Pro be installed in order for the KONA Easy Setups to be properly installed for FCP use, FCP should have been run at least once prior to installing the AJA KONA 3G driver. If other capture cards have been installed, the software for those products should be removed before installing the KONA driver to avoid possible conflicts.
3. For the KONA 3G, AJA recommends that the card be placed in Slot 3 and the Apple Expansion Slot Utility be configured so that the slot is running at x4 lane speed or higher. (The choice of x4, x4, x1 and x16 is ideal.) Refer to the AJA website at:

   http://www.aja.com/support/kona/kona-system-configuration.php

4. Install AJA KONA 3G software on your Mac (while the CD supplied with your card will likely have a recent version of the driver, the fast paced nature of feature releases and updates means that visiting the AJA website for the latest driver is usually a better choice.)

   http://www.aja.com/support/konaNEW/kona-3g.php

5. Cable the system audio and video sources, VTR, audio monitor, and video monitor. If you purchased the optional Breakout Box, then install it into an equipment rack or place it on a desk and connect its cables to the KONA 3G card. If you're instead using the standard cable set, then use those to connect equipment.

Each of these steps are explained in greater detail in the pages of this chapter.

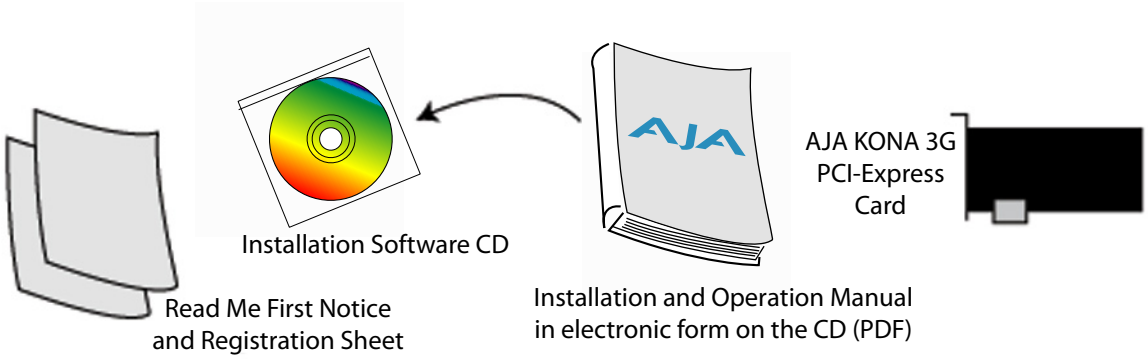
Unpacking

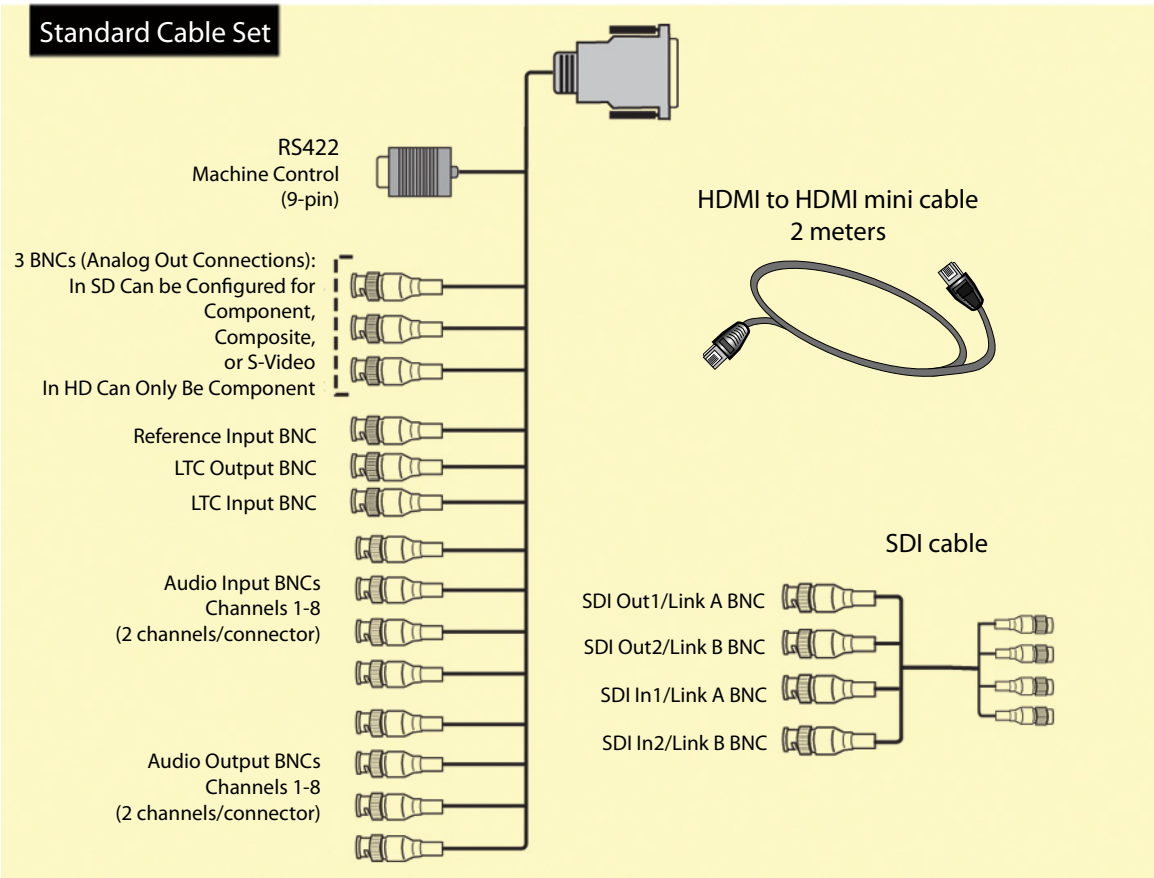
Shipping Box Contents

KONA 3G is shipped with a CD containing system software for installation and a user manual (a PDF on the CD), and three cables:

- Multi-pin to multi-connector breakout cable
- x4 BNC to 1.0/2.3 connectors cable
- HDMI Mini to HDMI audio/video output cable

If you purchased the optional K3G-Box breakout box, it ships with a multi-pin to multi-pin cable for connecting from the KONA 3G card to the breakout box. The x4 BNC cable to 1.0/2.3 connectors cable that shipped with the card is also needed interconnect the SDI connectors out of the card to the breakout box. Also, the HDMI cable connects between the 3G card and the box rear panel.


Installation Software CD
AJA KONA 3G PCI-Express Card
Read Me First Notice and Registration Sheet
Installation and Operation Manual in electronic form on the CD (PDF)


Standard Cable Set
RS422 Machine Control (9-pin)
HDMI to HDMI mini cable 2 meters
3 BNCs (Analog Out Connections): In SD Can be Configured for Component, Composite, or S-Video In HD Can Only Be Component
Reference Input BNC
LTC Output BNC
LTC Input BNC
SDI cable
Audio Input BNCs Channels 1-8 (2 channels/connector)
SDI Out1/Link A BNC
SDI Out2/Link B BNC
SDI In1/Link A BNC
SDI In2/Link B BNC
Audio Output BNCs Channels 1-8 (2 channels/connector)

Contents, KONA 3G Shipping Box Contents

As you unpack the shipping box(es), carefully examine the contents. Ensure you received everything and that nothing was damaged during shipment. If you find any damage, immediately notify the shipping service and supply them with a complete description of the damage. AJA will repair or replace damaged items. If you find shipping damage, contact your AJA dealer or distributor for details on how to have your KONA 3G repaired or replaced.

Note: Save packing materials and the shipping box. If you ever require service or move your system—use the packaging materials and box for safe shipment.

Installing the KONA 3G Card into a MacPro

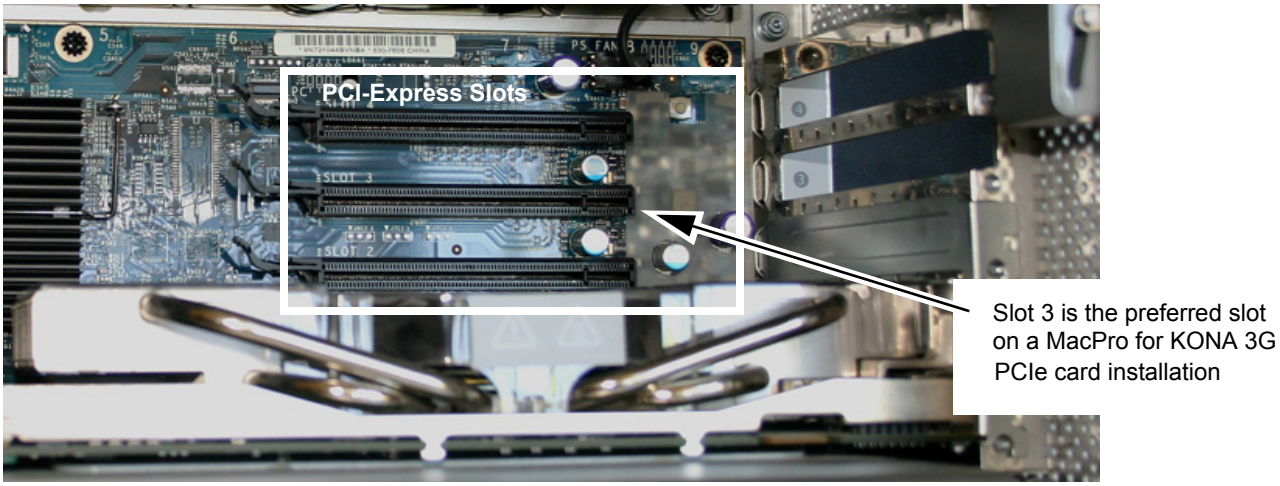
1. Place the computer in a well-lit area, where you will have easy access when opening the MacPro chassis.
2. Using your hand, touch the outside of the Mac to discharge any static electricity you have. Remove the power cable from the back of the chassis.
3. Remove the side access door and described in your Apple User Manual. Lay the machine on its side, motherboard facing up.
4. Remove the KONA 3G card from its protective anti-static bag; place the card on top of the bag.
5. Visually locate the PCI-Express slots inside the Mac chassis (Mac Pro photo shown on the following page). The KONA card only requires a x4 lane PCI-Express slot, so any of the available slots will work correctly—(slot 3 is the preferred slot on the MacPro). You should configure the slots with the Apple Expansion Slot Utility application for the MacPro so that the KONA is at x4 or better speed.
6. Remove the card-edge access cover from the desired slot where you will be inserting the KONA 3G card. The card edge cover is secured by a tie-down bar with two secured screws on MacPro computers; remove and set them aside for securing the KONA 3G after installation.
7. Holding the KONA 3G card by the card edge plate and an outside edge, carefully insert the KONA 3G card by rocking it slowly into the slot. Ensure the card edge aligns properly with the computer's slot opening (where the card edge cover was just removed) and that it is fully seated in the slot.
8. Secure the card in the slot using the screw removed earlier or with the tie-down bar found on MacPro machines.
9. Replace the outer access door on the MacPro.

KONA 3G Card

To Install:

1. Remove Screw and Cover Plate and Insert KONA Card
2. Secure KONA with Screw Removed Earlier

Mac Pro Cardcage Access



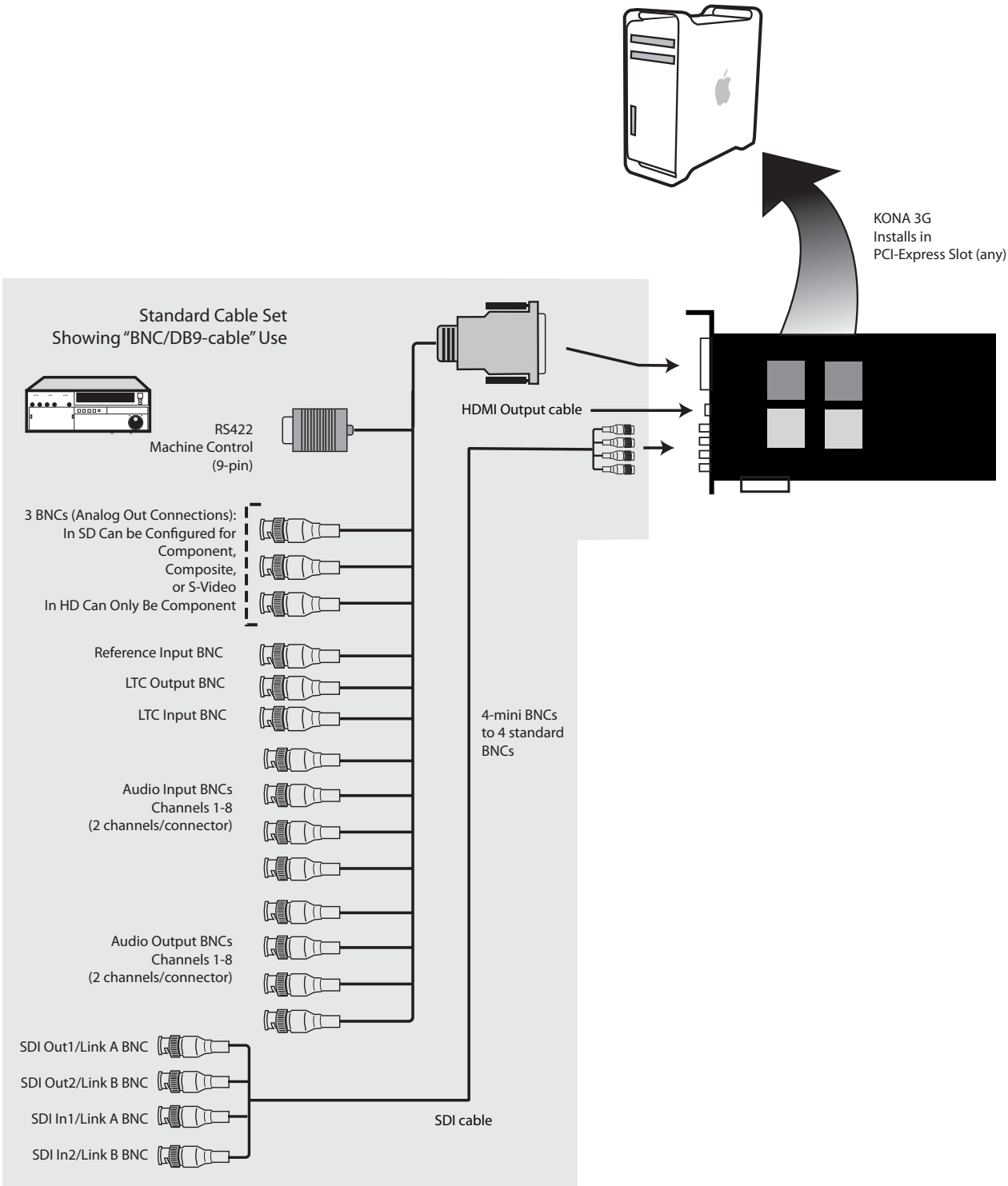
Card Slots, PCIe Mac Pro shown here

Note: After you install the KONA 3G card, you may notice that in the MacOSX Network preferences there is a message stating "You have a new network port named KONA 3G —be sure to check the settings...". There is no need to take any action. This occurs because MacOSX detects the RS-422 serial port on the KONA 3G card that you will use for VTR machine control.

Cabling the System

System Video/Audio Cable Connections

When installing your system, you'll make video and audio input/output connections. These connectors are explained individually in Chapter 2. Here, system interconnection is shown and described.

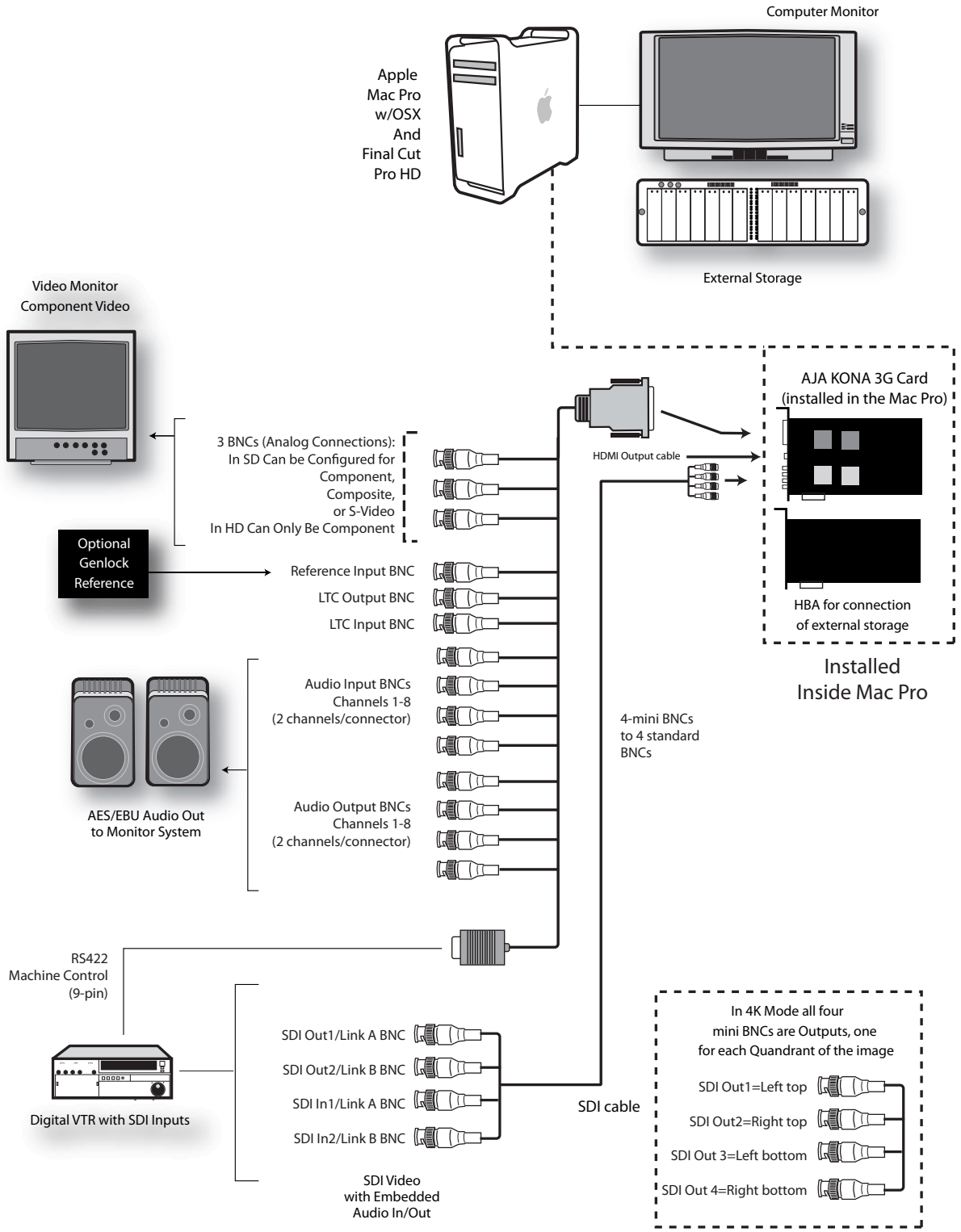


KONA 3G System Using Breakout Cable

Typical System

A figure on the following page shows typical system interconnections for a system with digital A/V sources. Your system may differ depending on VTRs, audio monitoring, and video monitoring.

1. If desired, connect your house reference sync to the KONA 3G Ref Loop connector (BNC). On the breakout cable this is a terminated reference input. The second KONA 3G Ref Loop connector on the optional Breakout Box can be connected to your VTR. If you do not loop through the reference, the second connector should be terminated with a 75 ohm terminator.
2. Connect a Video Monitor to the KONA 3G Component Analog Video Out BNC connectors (preferred), or instead connect to a composite monitor. (If you have an SDI or HD-SDI enabled monitor, you may also connect one of the KONASDI outputs to a monitor as well.)
3. Connect the 9-pin DB9 machine control cable on the supplied breakout cable to your VTR's RS422 control port or connect a 9 pin DB9 cable between the breakout box and the VTR's RS422 serial port.
4. Connect two SDI cables between KONA 3G and your digital VTR (Digital Betacam etc.): one from KONA 3G SDI In to the VTR SDI Out, and one from KONA 3G SDI Out (1 or 2) to the VTR SDI In. The KONA 3G SDI connections have embedded audio (16-channels) so the VTR must be configured accordingly. These connections will be made via the mini-connectors-to-BNC cable or via the optional K3G-Box.
5. If you have an AES/EBU-ready audio monitoring system, then connect the eight channels of AES/EBU output from KONA 3G's BNC connectors: 1/2, 3/4, 5/6, and 7/8, to the monitoring system AES/EBU inputs. If instead you have an analog audio monitoring system, you can use the two RCA-style unbalanced stereo output jacks on the optional K3G-Box for output.



Typical System Connections

Installing KONA 3G Software

First ensure that Final Cut Pro is installed as detailed in its user documentation. Next, install the KONA 3G driver. You cannot use KONA 3G with Final Cut Pro until the Final Cut Pro software has been installed and run at least once on the Mac. You also cannot use KONA 3G with Final Cut Pro until you run the KONA 3G driver and software installer.

System software updates may occasionally become available to AJA KONA 3G owners on our website (*http://www.aja.com*). We recommend checking occasionally for both software updates and additional product information. For KONA 3G software see:

http://www.aja.com/support/konaNEW/kona-3g.php

Note: If your Mac has previously had another video capture or multimedia card installed, ensure you remove the card and uninstall any related software before installing KONA 3G. This will prevent any hardware or software conflicts. KONA 3G will operate properly on a Mac that also has an AJA Io product and its associated drivers installed.

Software Installation Procedure

For the most recent version of the KONA 3G driver, it is best to visit the AJA website at *http://www.aja.com*, download the driver and read the details and requirements on the current driver to ensure compatibility with your system configuration. Your system should be an Apple Intel MacPro. Minimum system requirements for the host were described in *Chapter 1: System Requirements*.

Note: Before installing KONA 3G software, turn off any virus protection and security software that you may have installed on your computer.

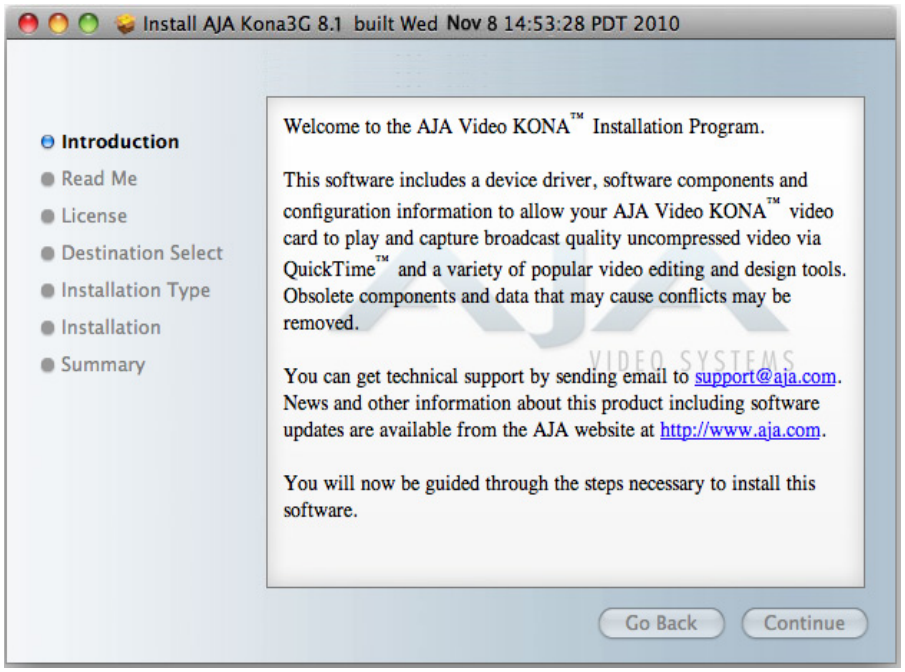
1. Visit the AJA website for the latest driver version appropriate to your configuration. Alternately, if you have no internet connection, insert the KONA 3G CD in the Mac; as noted, this driver version may not be the most current.
2. Locate the downloaded driver on the desktop or the KONA 3G CD icon on the desktop.
3. Locate the package file in the folder from the download or by double clicking on the CD; the package has an icon that looks like a box and has a ".pkg" suffix.

Note: Files ending in the ".pkg" suffix are OS X installer files. These launch the OS X installer and tell it where and what to install on your system.

4. Double-click the package to log on and begin software installation.
5. The system will respond by asking you to authenticate who you are as currently defined on your OS X user profile. Enter the proper name and password at the Authenticate prompt; if you have multiple users defined, ensure that you log on as a user with administrator-level authority.

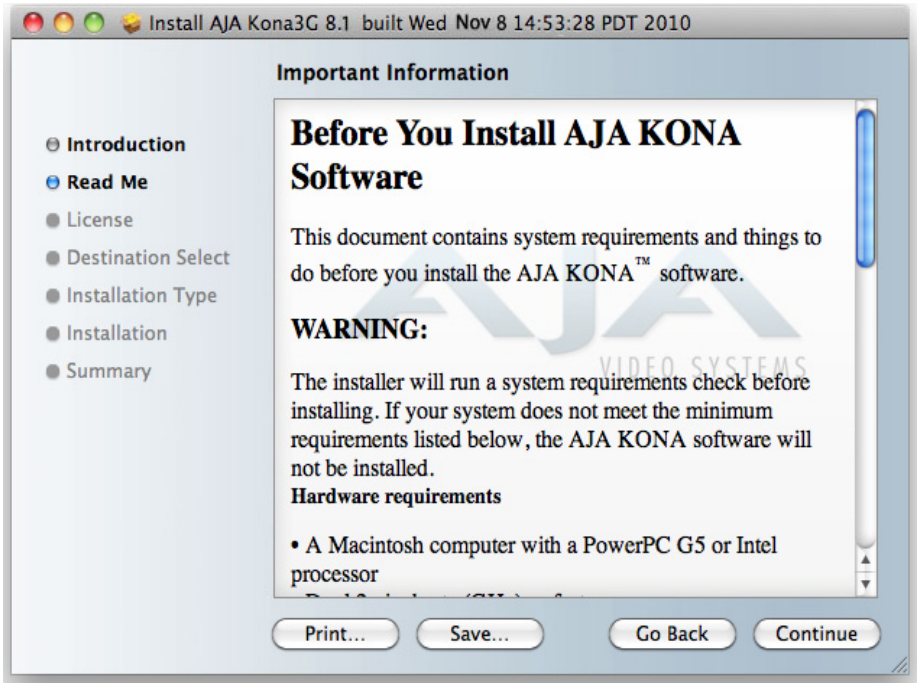
Log On Authenticate Prompt

6. Click on the *OK* button after entering a valid user and password.
7. The installer will launch and you'll see a series of installer screens.


Install AJA Kona3G 8.1 built Wed Nov 8 14:53:28 PDT 2010
Introduction
Read Me
License
Destination Select
Installation Type
Installation
Summary
Welcome to the AJA Video KONA™ Installation Program.
This software includes a device driver, software components and configuration information to allow your AJA Video KONA™ video card to play and capture broadcast quality uncompressed video via QuickTime™ and a variety of popular video editing and design tools. Obsolete components and data that may cause conflicts may be removed.
You can get technical support by sending email to support@aja.com. News and other information about this product including software updates are available from the AJA website at http://www.aja.com.
You will now be guided through the steps necessary to install this software.
Go Back
Continue

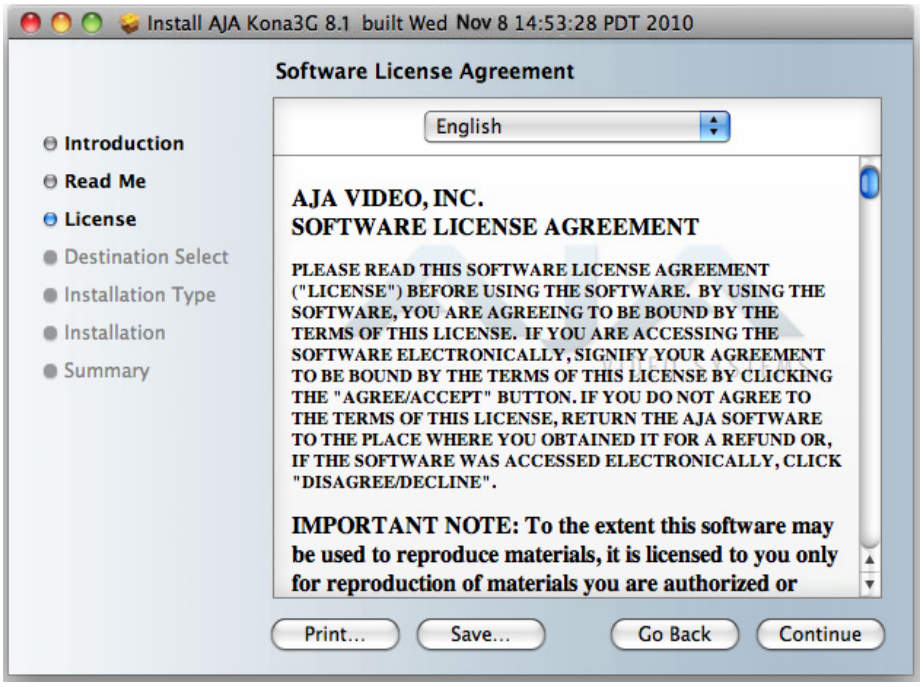
Initial Installer Screen

8. Click *Continue* to begin installation.
9. The next screen lets you know that the installer will check your Mac to ensure it has the hardware and software resources required (see Minimum Requirements in Chapter 1).


Install AJA Kona3G 8.1 built Wed Nov 8 14:53:28 PDT 2010
Important Information
Introduction
Read Me
License
Destination Select
Installation Type
Installation
Summary
Before You Install AJA KONA Software
This document contains system requirements and things to do before you install the AJA KONA™ software.
WARNING:
The installer will run a system requirements check before installing. If your system does not meet the minimum requirements listed below, the AJA KONA software will not be installed.
Hardware requirements
• A Macintosh computer with a PowerPC G5 or Intel processor
Print...
Save...
Go Back
Continue

System Check Installer Screen

10. Read and agree to the Software License Agreement.


Install AJA Kona3G 8.1 built Wed Nov 8 14:53:28 PDT 2010
Software License Agreement
Introduction
Read Me
License
Destination Select
Installation Type
Installation
Summary
English
AJA VIDEO, INC.
SOFTWARE LICENSE AGREEMENT
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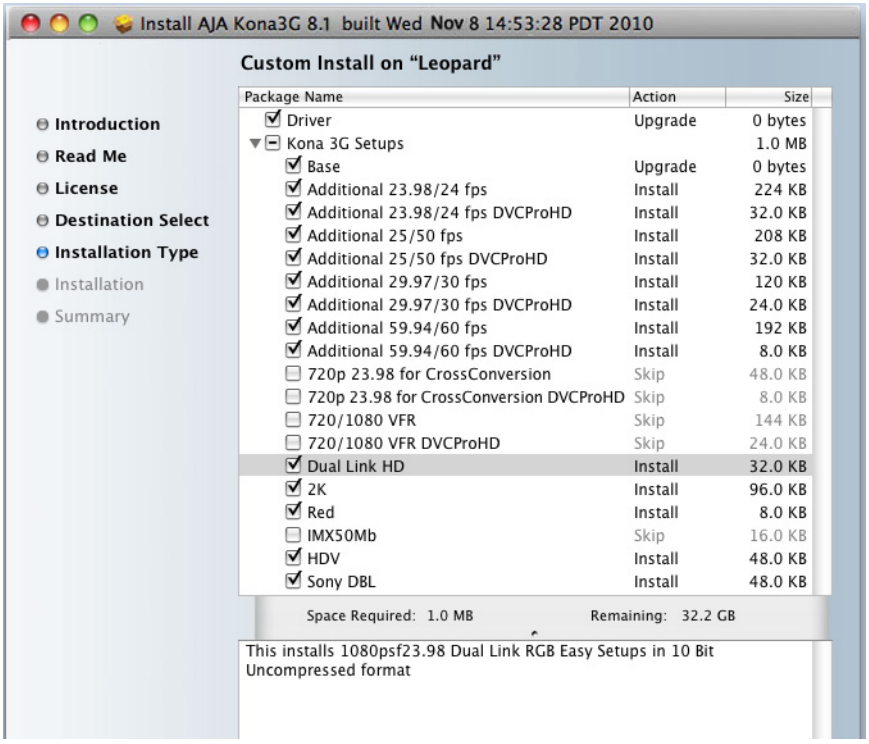
Print...
Save...
Go Back
Continue

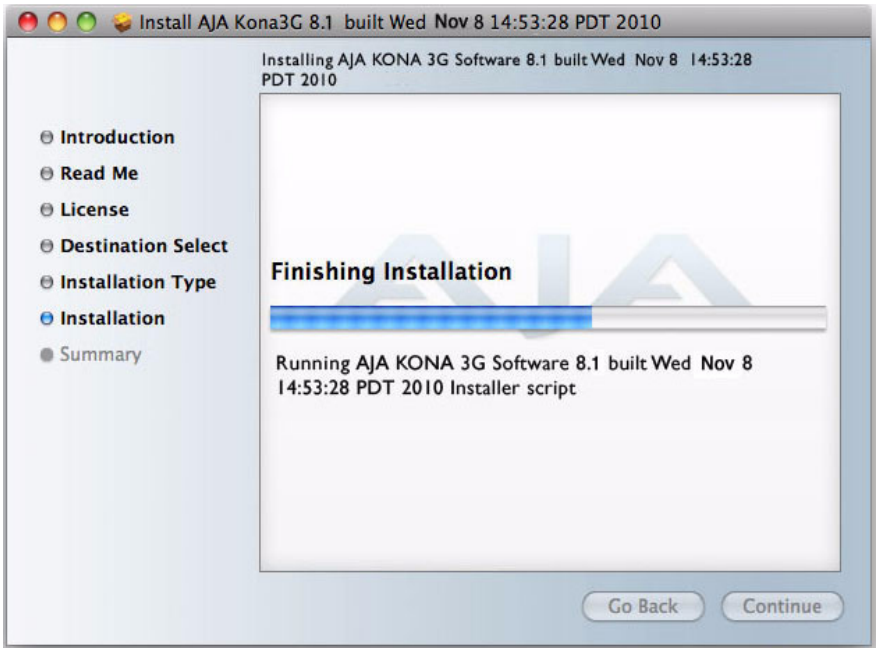
KONA 3G Software License Agreement Screen

11. At the next screen, click the *Install* button to place the software on your computer.

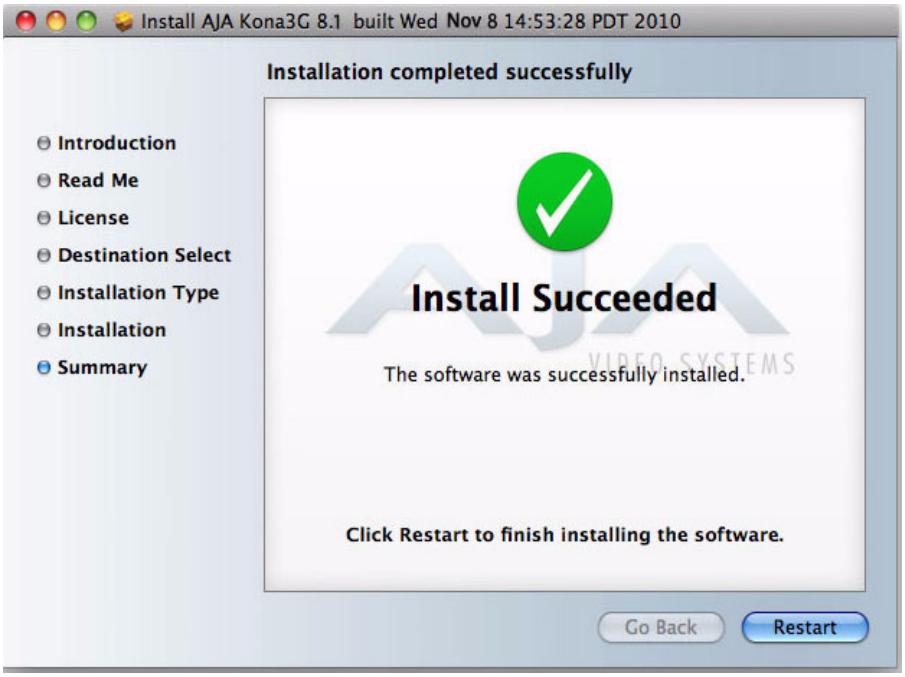

Install AJA Kona3G 8.1 built Wed Nov 8 14:53:28 PDT 2010
Custom Install on "Leopard"
Introduction
Read Me
License
Destination Select
Installation Type
Installation
Summary
Package Name
Action
Size
Driver Upgrade 0 bytes
Kona 3G Setups 1.0 MB
Base Upgrade 0 bytes
Additional 23.98/24 fps Install 224 KB
Additional 23.98/24 fps DVCProHD Install 32.0 KB
Additional 25/50 fps Install 208 KB
Additional 25/50 fps DVCProHD Install 32.0 KB
Additional 29.97/30 fps Install 120 KB
Additional 29.97/30 fps DVCProHD Install 24.0 KB
Additional 59.94/60 fps Install 192 KB
Additional 59.94/60 fps DVCProHD Install 8.0 KB
720p 23.98 for CrossConversion Skip 48.0 KB
720p 23.98 for CrossConversion DVCProHD Skip 8.0 KB
720/1080 VFR Skip 144 KB
720/1080 VFR DVCProHD Skip 24.0 KB
Dual Link HD Install 32.0 KB
2K Install 96.0 KB
Red Install 8.0 KB
IMX50Mb Skip 16.0 KB
HDV Install 48.0 KB
Sony DBL Install 48.0 KB
Space Required: 1.0 MB
Remaining: 32.2 GB
This installs 1080psf23.98 Dual Link RGB Easy Setups in 10 Bit Uncompressed format

Easy Install, Installer Screen

12. The installer will run and put all the necessary KONA 3G drivers, AJA Control Panel, presets and additional software on the desired hard drive. When it has completed installation, you'll be asked to restart. the computer.


Install AJA Kona3G 8.1 built Wed Nov 8 14:53:28 PDT 2010
Installing AJA KONA 3G Software 8.1 built Wed Nov 8 14:53:28 PDT 2010
Introduction
Read Me
License
Destination Select
Installation Type
Installation
Summary
Finishing Installation
Running AJA KONA 3G Software 8.1 built Wed Nov 8 14:53:28 PDT 2010 Installer script
Go Back
Continue

Installation Progress Bar



Final Installation Screen

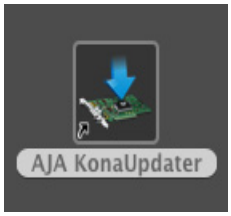
13. Click the Restart button to complete the installation procedure. The system will perform a software restart and be ready for use.

Updating KONA 3G Firmware

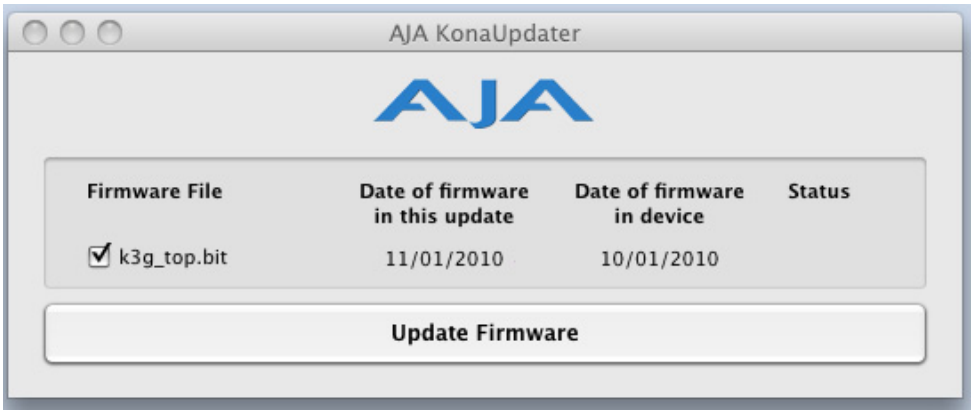
When you update your KONA 3G software by downloading new versions from the aja.com website, it is possible that some versions may also require a firmware update to update the software stored in non-volatile memory on the board. Always carefully read the release notes that accompany each version to be installed. The release notes will spell out all required software and hardware necessary to ensure a successful update of your KONA 3G.

Follow these instructions when a firmware update is required:

1. First install the new version of KONA 3G software.
2. After successfully installing the new KONA 3G software, the AJA KONA Updater will automatically launch. (The updater application is located in the *AJA Utilities folder*.)



3. When the updater starts, the following screen will display indicating the current firmware and update firmware creation date.



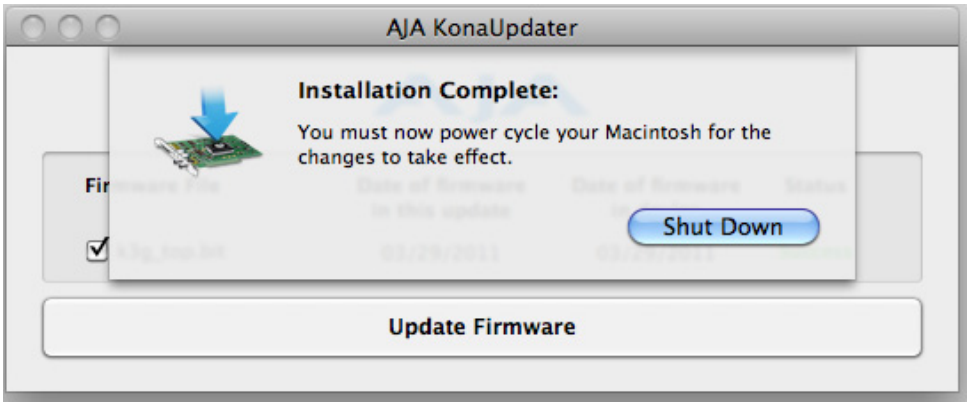
Firmware Update Welcome Screen

4. Click *Update Firmware* to begin the update process. Do not interrupt the update process

AJA KonaUpdater
Warning:
It will take about 45 seconds to update the firmware. Interrupting the firmware update before it is complete will cause the device to malfunction. At that point you'll have to start the device in safe boot mode and try again.
Cancel
Continue Update

Firmware Update Warning Screen

5. After the firmware installation completes, you'll be asked to **Shut Down** the Mac computer, wait for two seconds, and then start up again.


AJA KonaUpdater
Installation Complete:
You must now power cycle your Macintosh for the changes to take effect.
Shut Down
Update Firmware

Firmware Update Warning Screen

Important: A **Restart** of the Mac will not load the new firmware—click Shut Down to initiate a complete ON/OFF power cycle to load the new firmware into the hardware.

Genlock and Your System

For video stability and proper system operation, it's best to genlock all equipment to house sync. Although genlock is not required for KONA 3G or your system, better quality will be seen by doing so. Usually, this means using a black burst generator output looped through the system. On the KONA 3G cables and optional K3-Box breakout box, house sync is connected to "Ref Loop".

Chapter 4: Final Cut Pro & Other Software

Final Cut Pro

After you install the KONA 3G software on your Mac, all you need to do to begin using it is to become familiar with the AJA Control Panel (KONA 3G Control Panel) and how Final Cut Pro works with KONA 3G.

Note: When only a single AJA device is installed in the computer, the AJA Control Panel will be titled (in the screen header) "KONA 3G Control Panel." If more than one AJA device is installed, it will be titled AJA Control Panel and there will be a device type and selection pulldown in the upper left corner (see *"Using Multiple AJA Products" on page 98*). In this chapter text it is referred to as "AJA Control Panel."

With Final Cut Pro you'll choose the proper setups from those provided by AJA to utilize the card for input and output. These provided setups are called "Easy Setups" in Final Cut Pro and are available to use under Audio/Video Settings in the "Final Cut Pro" menu (next to the apple menu). For unique workflows or situations, the AJA provided Easy Setups may be copied and modified.

You'll also need to gain familiarity with the AJA Control Panel, which will be used for source input selection, configuring many KONA 3G features, and for creating your own preset configurations for different applications.

The manual you are reading does not provide operational information about Final Cut Pro. Please read the Final Cut Pro user documentation provided with it for information on configuration and operation. The chapter you are reading addresses configuration and setup unique to the use of KONA 3G with Final Cut Pro and other applications.

Using The AJA Control Panel

The AJA Control Panel is a software application that provides a simple visual way to see how the KONA 3G card is currently configured and then make changes as desired. Control Panel settings can be saved as a preset for recall at anytime. This lets you save settings associated with all your frequent tasks; then as you switch tasks you don't have to spend extra time resetting card configurations. Simply load the previously saved settings for each task. To save a Preset, make the changes in the interface and choose *File>Save Preset* from the AJA Control Panel pulldown menu.

One thing you'll notice instantly about the control panel is that it represents a visual block diagram of how the card is set. The current status of the up-converters/down-converters, the input and output settings, and many other details can be viewed as a color-coded block diagram in the control panel.

You can even access the KONA Control Panel application without exiting the application by first holding down the command key (Apple key) before mouse clicking on the KONA Control Panel
application on the desktop.

For this reason, it is useful to leave the KONA Control Panel application on the desktop while you work in applications and simply command click into it to access it if you are unsure of a setting or wish to make a change.

Control Panel Basics

Although the KONA 3G card auto-detects the input format depending on the input that it is presented, and the Control Panel intuitively shows at a glance much about what the card is doing—there is even more information presented that may not be obvious. To ensure you make the most of the software, run the AJA Control Panel application and look at its display. Then refer to the "Basics" described here to better understand what you're seeing and learn how to view and change the KONA 3G system configuration.

> **Note:** The KONA Control Panel also works with KONA LS/LSe, KONA LH/LHe, and KONA 2. However, the actual features and screens displayed differ slightly since the board feature sets differ. Currently, only one KONA card can be installed in a Mac at a time.

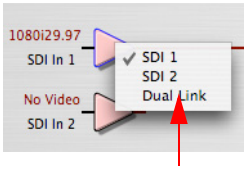
Here are some basic definitions you should become familiar with (please refer to the figure that follows for reference). After studying the basics, read "*Who is Controlling KONA 3G*?" later in this chapter for more advanced information on how applications interact with the KONA 3G board.

Tabbed Screens – the bottom area of the AJA Control Panel provides different information categorized by topic. Clicking on one of the "Tab" items in the left navigation column displays an information screen for that topic. Each of the tabbed screens is described on the following pages.

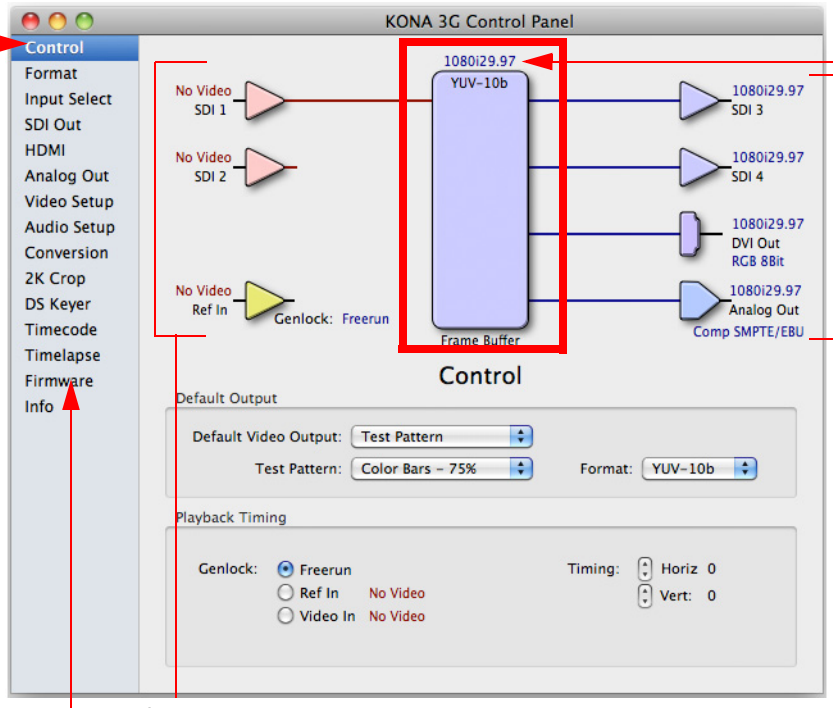
Tab screens available are:

Control: configures KONA 3G default output (test pattern, pass through, desktop, etc.) and sets genlock and output timing.
Format: select the framebuffer primary video format, any secondary formats, and parameters of up/down/crossconversion for input/output.
Input Select: view and edit input selections and how they are mapped.
SDI Output: assign outputs to either Primary or Secondary formats.
HDMI: configure the HDMI output parameters.
Analog Output: configure the component/composite +Y/C analog output.
Video Setup: select desired analog video signal setup parameters to maximize component or composite output for monitoring.
Audio Setup: enable/disable KONA 3G audio unity gain and DBL capture options.
Conversion: select codec options such as whether paused video appears as a full frame or a single field (jitter shown or not shown) and 24 to 30 fps padding patterns. Select RGB range, and Stereo 3D signal configuration (if applicable).
2K Crop: select crop mode and specify X-Y location of displayed area for 2K frames captured with VTR Exchange and brought into Final Cut.
DS Keyer: setup and control the insertion of keyed video from the frame buffer or graphics files with alpha channel.
Timecode: monitors RP-188 timecode and configure timecode window burn output (Note: SMPTE 12M-2 is the updated name and specification for what was RP-188).
Timelapse: capture and produce QuickTime files specifying framerate and time interval settings.
Firmware: choose between Standard and 4K Modes and initiate installation of the firmware.
Info: displays specific KONA 3G hardware ID information and shows the software files that have been installed on your system (important service reference information).

Block Diagram Screen – the top area of the AJA Control Panel shows a visual picture representing the processing (if any) that's currently occurring, including inputs/outputs, any up/down/cross conversion, reference source, and system status. Lines between inputs, the framebuffer, and outputs, show a video path. Where there are no lines, it shows there is no connection; this can be either because an input or output isn't selected or because no video is present at the selected input. The lines will also show whether the input or outputs are single inputs/outputs or dual-link (where two channels are used to carry the bandwidth of HD-SDI 4:4:4 video), and whether output is video or video + key.
Icon objects on the block diagram screen (input/output icons, frame buffer, etc.-also called "widgets"-indicate their status by color (explained later) and can be clicked for context-sensitive information and choices. (These same choices can also be made from the tabbed Control panel screens.)



Control-Clicking an Icon Produces a Context-sensitive Menu



Currently selected Tab Screen

Framebuffer Format (Primary Format)

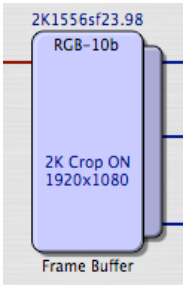
Outputs: SDI, HDMI and analog

Inputs

Tab Screen Choices – Click One to Edit/View a Topic

AJA Control Panel, Block Diagram

Note: You can use the Up/Down arrows on your keyboard to navigate Tab selections



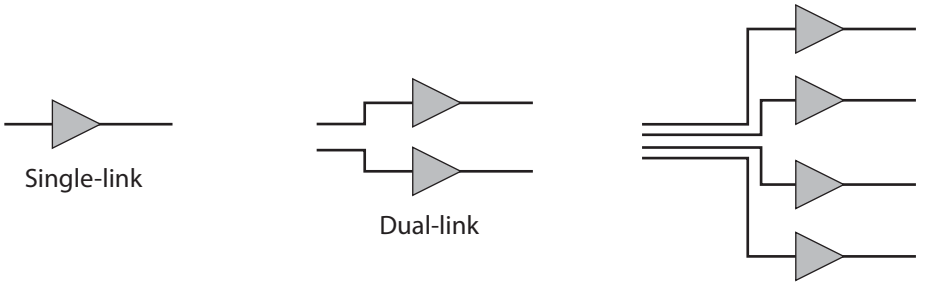
Framebuffer—the framebuffer is the "engine" in the KONA 3G card where active video operations take place using Final Cut Pro, other 3rd-party applications, or even KONA 3G itself. The framebuffer has a format (called the "Primary Format" and color space that it follows, as defined in the Tabbed Windows or via external application software (such as the "Easy Setups" in Final Cut). If the framebuffer is processing 2K frame video-and video cropping is turned ON, it will indicate the cropping by showing a "shadow" underneath the icon (more later on how it's cropped).

It is important to realize that inside the Macintosh many applications can use the KONA 3G card (as you switch from window to window) and it may not always be obvious which is currently controlling it. The AJA Control Panel displays the name of the application controlling the card in red text on the Format and Control tabs of the interface. If an application does not properly "let go" of the card as another takes over-you'll be able to tell by looking at the Control Panel.

Primary Format—the video format currently assigned to KONA 3G. This is the format that the framebuffer will use and is shown in the Control Panel using the color blue. All icons in blue are the same as the Primary Format used by the framebuffer. Also any text descriptions in the block diagram that appear in blue also indicate that something is in the primary format. So, for example, if you see that the input and output icons are blue, then you know that the same format is used throughout the video path and that no format conversion is being performed. If a different color is displayed on the input or output, green for example, then you know that KONA 3G is performing a format conversion in the video path.

Secondary Format—any format other than the currently selected Primary Format, is a secondary format. As described previously, this means that either the Inputs or Outputs are somehow different from the framebuffer's assigned format (i.e., the "Primary Format"). This can be seen at a glance because the color will be different than blue.

Input/Output Icons—the input and output icons are triangles that together with their color show all the input and outputs and their status (selected, not selected, input present or not, format, etc.). A complete video path is shown when inputs and outputs are connected with lines going to/from the framebuffer.



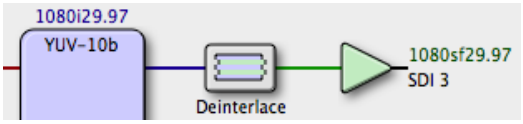
Input/Output Icons

Conversion Icons—when an input or output is a different standard than the framebuffer then the KONA 3G may be upconverting, downconverting or crossconverting the signal to the proper standard. This may be automatic, because it's detected an input signal that differs from the standard currently selected, or because you've explicitly told it to convert. In either case, the block diagram will show the conversion by displaying a conversion icon in between the input/output and the framebuffer. In the case of cross-conversion, the type of crossconvert will be shown under the icon (in the example that follows, it's "1080 to 720").

Down, Up, and Cross Conversion Icons

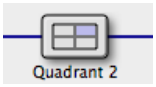
Note: Up, Down, and Cross Conversion are not available in 4K Mode.

When an output is converted from an interlaced format (1080i) to the same frame size but a progressive format (1080sf), you will see the deinterlace icon in the signal path.



Deinterlace Icon

Quadrant Picker Icon—in 4K Mode only one quadrant of the 4K video stream may be selected for HDMI and Analog outputs. Access the respective tab to make this selection in the Quadrant pulldown menu.



Indicates the quadrant selected for output.

Color Meanings—all items in the AJA Control Panel block diagram are color-coded to show what is happening in realtime. This applies to both icons and text. These colors have the following corresponding meanings:

Blue: video is same format as the Primary Format (framebuffer)
Red: the selected operation cannot be performed or an invalid selection has been made
Yellow: reference video (black burst or other reference source)
Green: indicates that KONA 3G is performing some kind of active change to the video, to make it different from the Primary Format (e.g., up/down convert, format change, etc.).

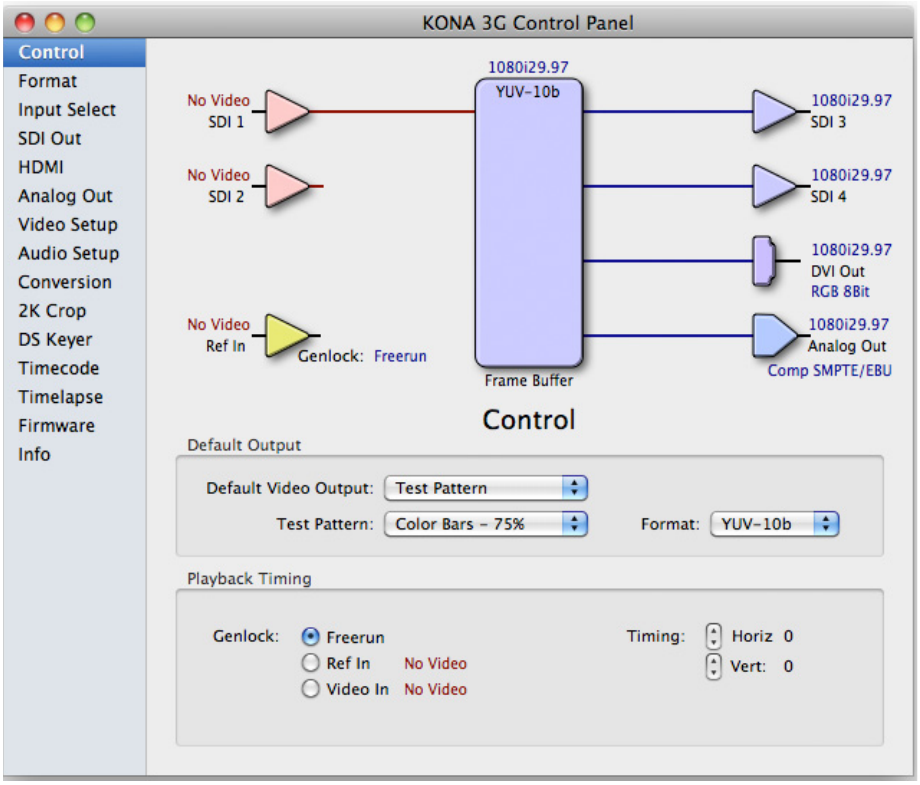
Standard Mode Control Panel Operation

The following AJA Control Panel descriptions reflect Standard Mode operation. For Control Panel operations and tab screens unique to 4K Mode. {*See "Using 4K Mode" on page 88.*}

Control Tab Screen

The KONA 3G can be controlled by various software applications running on a host Mac as well as be used as a Macintosh Desktop extension. The Control Tab is where you select how the KONA 3G directs video and is used by application software. This screen also provides control for configuring output timing with regard to external reference video and horizontal/vertical delay.

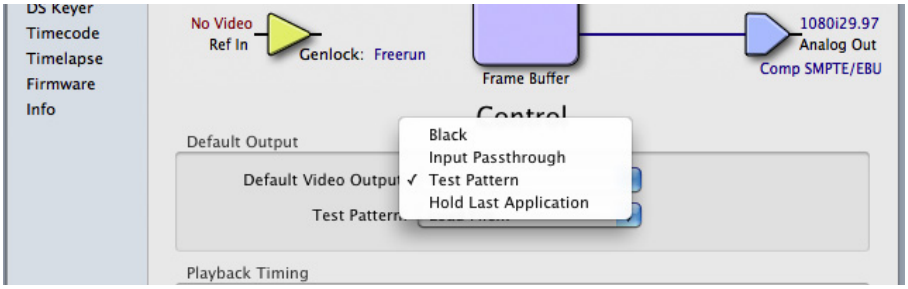
At the top of the Control screen it will show the current Default Output and the application currently controlling the KONA 3G card (if there is one). For example, in the screen shown here, the default output is the Macintosh Desktop and the only controlling application is the AJA Control Panel itself.



AJA Control Panel, Control Tab

Control Tab Screen Settings

Default KONA Output—this is where you select what KONA 3G will output as a default when no application has control of the board, such as when the Finder is active. Since KONA 3G can be controlled by software applications as well as its own control panel, the output can change dynamically. When you select many video applications, they will grab control of the KONA 3G card inputs/outputs. These settings determine what happens when an application that doesn't grab the KONA 3G inputs/outputs is active.



AJA Control Panel, Control Tab, Default KONA Output Pulldown Menu

Default KONA Output Choices and their meanings:

Macintosh Desktop: when selected, this selection causes the KONA 3G program video output (digital and analog) to be an extension of the Macintosh desktop. Mac OS windows and applications can appear (when applicable) on the KONA outputs. It is wise to select in the Mac OS System Preferences>Displays the checkbox "Show displays in menu bar" so that you can access the various settings for the extended desktop for your NTSC or HD monitor from the menu bar. Selecting "Number of Recent Items" and setting it to 10 is also beneficial for making configuration of the Macintosh Desktop mode simpler.

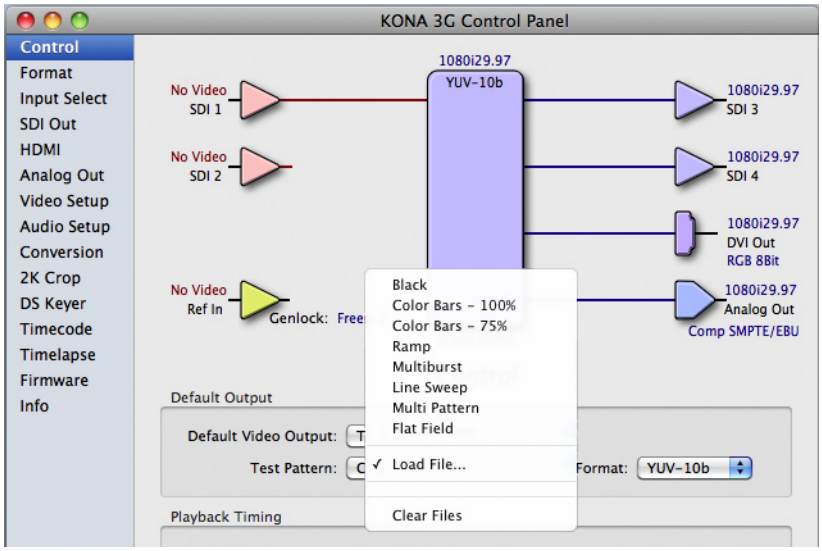
Note: Two versions of AJA drivers are offered on the Installer CD and website—a version that supports the Macintosh Desktop output and one that does not, identified by the three letters "NDD", which stands for "no desktop display." The NDD version is provided for users who experience issues when using the Macintosh Desktop enabled version of the driver with their particular system and GPU.

Black: this selection directs KONA 3G to output video black whenever an application isn't controlling the card.

Input Pass through: this selection directs KONA 3G to route video from its selected input through the card for processing and output. When this selection is in effect, all Primary/Secondary Format selections are available for selection in controlling the output. This in effect makes the KONA 3G as a converter when used in conjunction with the KONA Control Panel application and a Mac. No applications other than the KONA Control Panel need to be open to convert audio and video from one format to another. For example, if an SD source tape needs to be dubbed to an HD tape, the signal might be routed from the SD VTR to the KONA card, configured for upconversion in the KONA Control Panel and then passed through to the HD VTR for recording.

Test *Pattern*: this selection directs KONA 3G to output a choice of preset pattern when no other application is using the KONA board. In addition to the preset test pattern choices, a "Load File..." selection at the bottom of the menu allows you to load any standard Mac RGB graphics file (.tif,.psd, etc.) into the frame buffer for display.

Note: the graphic file will not be scaled to fit. If it's smaller than the current frame buffer format, KONA 3G will center it in the frame. If it's larger than the current frame buffer format, it will be cropped on the right and bottom. Also some graphics formats and bit depths may not be supported. Once a graphic file is loaded into the frame buffer it will be retained until it is overwritten by another graphic or test pattern, or when power is turned off. Graphic file names are only "remembered" in the menu as long as the KONA Control Panel application is running.



AJA Control Panel, Test Pattern Choices

Hold Last Application: this selection directs KONA 3G to hold and output the last frame of video from the last application to control KONA 3G. This can be helpful when operating in an environment where you're switching back and forth between multiple application windows.

Tip: pressing and holding the Apple *COMMAND* key while clicking in the KONA Control panel—while in any software application (Final Cut, etc.)—causes control of the KONA card to stay with that application, rather than shifting to the Control Panel. This works regardless of the setting of "Default KONA Output."

Genlock (*Freerun*, *Ref In*, *Input 1*, or *Input 2*)—selects how KONA 3G will synchronize program video:

Freerun: In this mode, KONA 3G generates sync without an external reference source

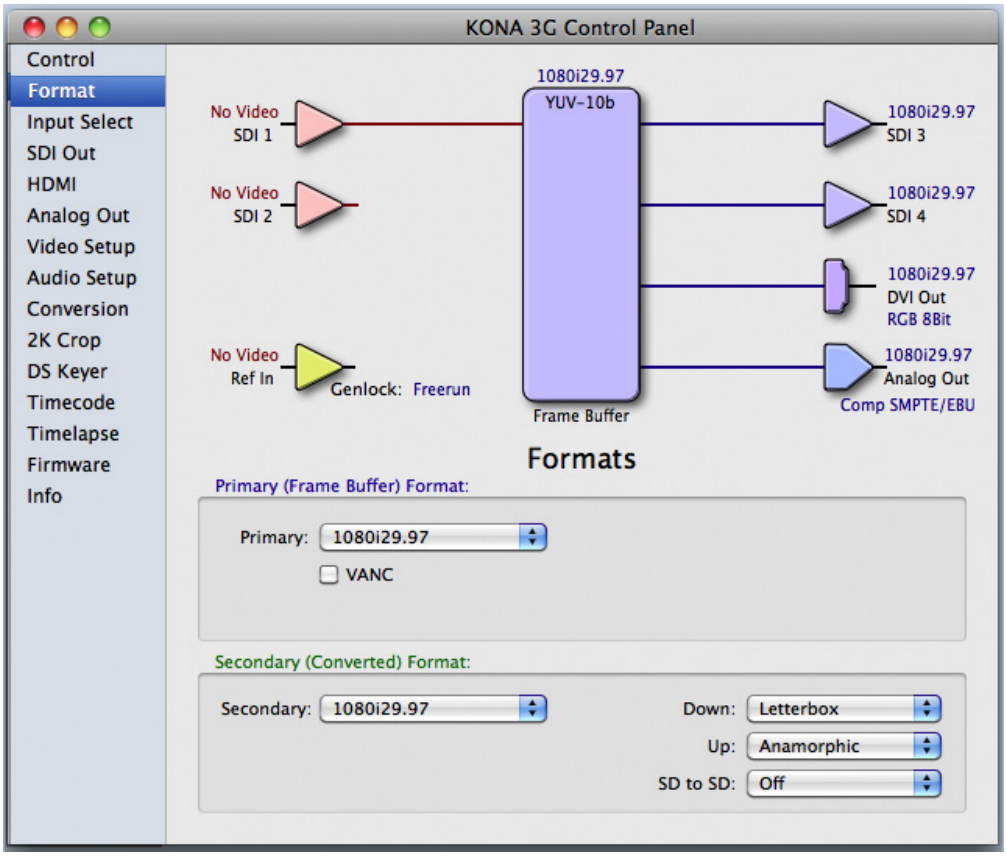
Ref In: Directs KONA 3G to use the Ref Video source for sync (usually an analog black burst video signal)

Video: Directs KONA 3G to use whichever video input source has been selected in the Inputs tab window for sync

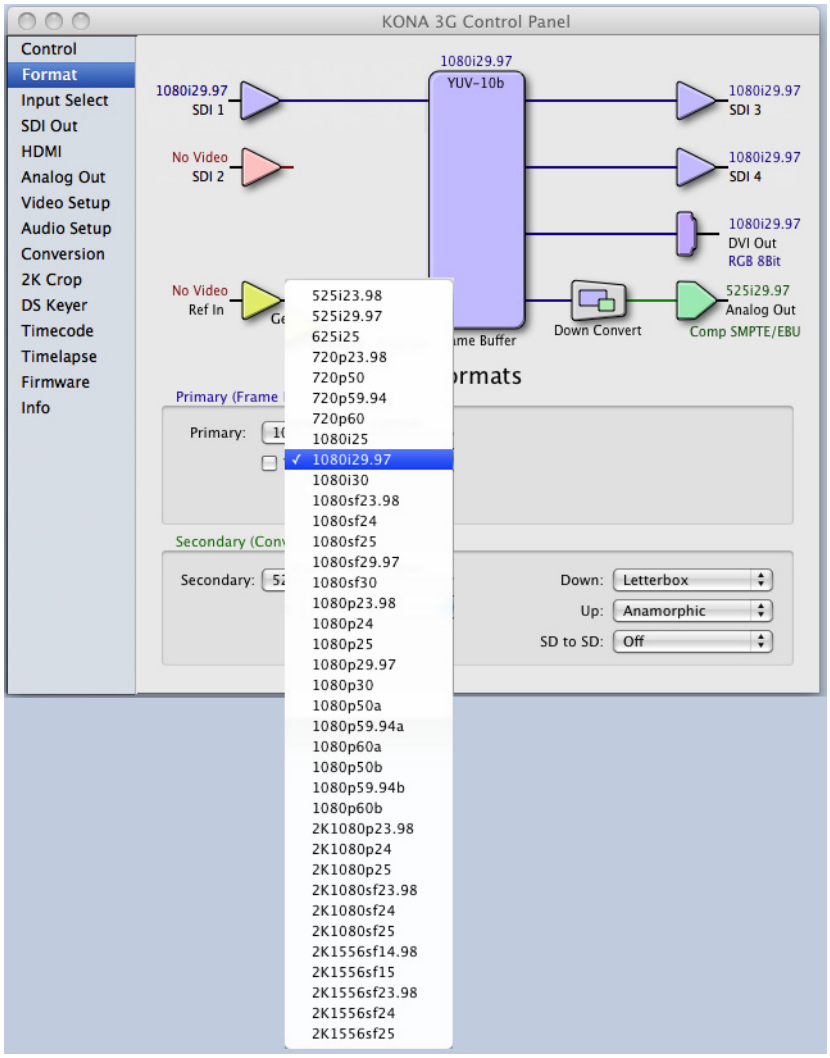
Timing (*Horiz* and *Vert*)—these two pull-downs allow output timing adjustment with reference to the Ref Video source selected. The Horizontal reference can be adjusted by selecting a number of pixels (clocks) to offset. Vertical can be adjusted by specifying a number of lines to offset.

Formats Tab Screen

The Formats screen shows the video format currently in use by the KONA 3G framebuffer (called the *Primary Format*) and allows you to change it. All throughout the Control Panel, choices are always presented based on what KONA 3G can do with the signals available and the inputs/outputs selected. For example, on the Formats screen, if the output or inputs are a different format than the primary, then you'll see an additional information pane that allows you to view and edit the secondary format—including control over whether up/down/cross conversion is employed.



AJA Control Panel, Formats Tab



AJA Control Panel, Formats Tab, Showing Primary Formats Pulldown Menu

Format Tab Screen Settings

Video Format—this pull-down menu shows the currently selected format. This pull-down appears in both the Primary Format area of the Formats screen as well as the Secondary Format area (if present). If you select an alternate value in the Primary Format using the pull-down, it will change the format used by KONA 3G's framebuffer. When a change is made via the Video Format pull-down or by clicking an icon (widget) and selecting a new format via a contextual menu, the block diagram will change to reflect the new format. In the case of a Secondary Format, the formats available can vary based on what the Primary Format is and the input signal (frame rates of input sources limits the to/from conversion choices). The "Secondary Video Format" pull-down menu lists all compatible formats in black (incompatible formats are shown in gray and cannot be selected). This allows you to see what you've chosen, and also see those formats that are compatible with the selected Primary format.

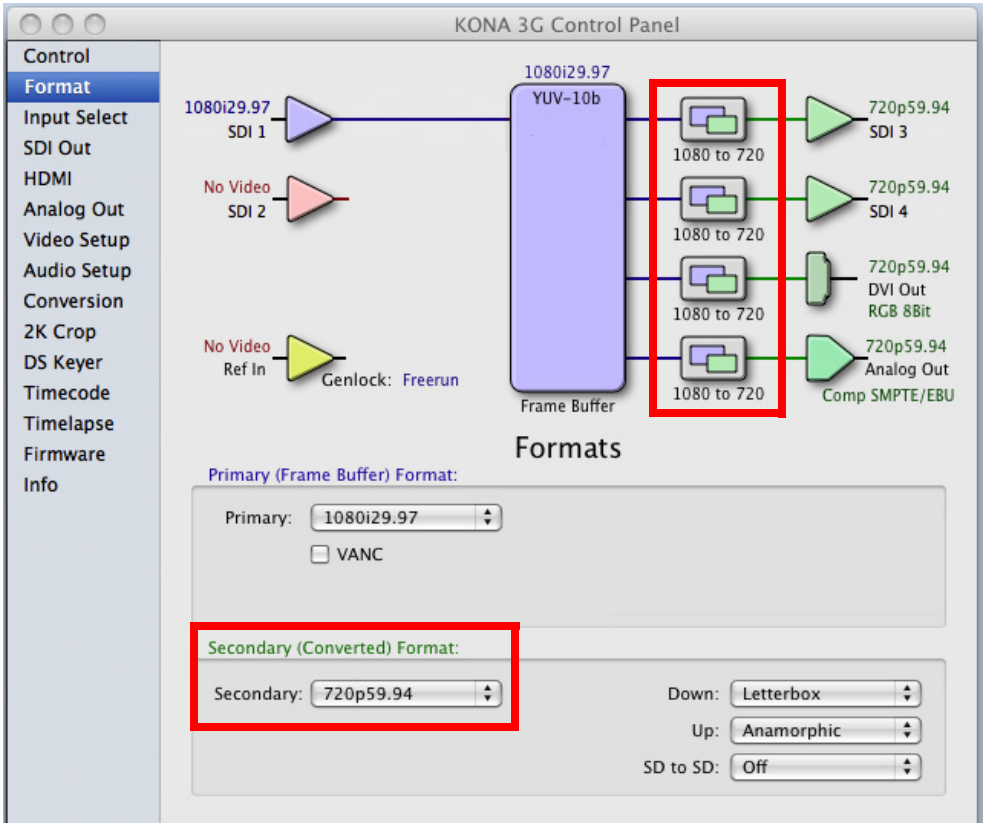
KONA 3G Formats include:

525i 23.98	1080i 25	1080p23.98	2K1080p23.98	**[In 4K Mode]**
525i 29.97	1080i 29.97	1080p24	2K1080p24	QuadHDsf23.98
625i 25	1080i 30	1080p25	2K1080p25	QuadHDsf24
720p 23.98	1080sf 23.98	1080p29.97	2K1080sf23.98	QuadHDsf25
720p50	1080sf 24	1080p30	2K1080sf24	QuadHDp23.98
720p 59.94	1080sf 25	1080p50a	2K1080sf25	QuadHDp24
720p 60	1080sf 29.97	1080p59.94a	2K1556sf14.98	QuadHDp25
	1080sf 30	1080p60a	2K1556sf15	4Ksf23.98
		1080p50b	2K1556sf23.98	4Ksf24
		1080p59.94b	2K1556sf24	4Ksf25
		1080p60b	2K1556sf25	4Kp23.98
				4Kp24
				4Kp25

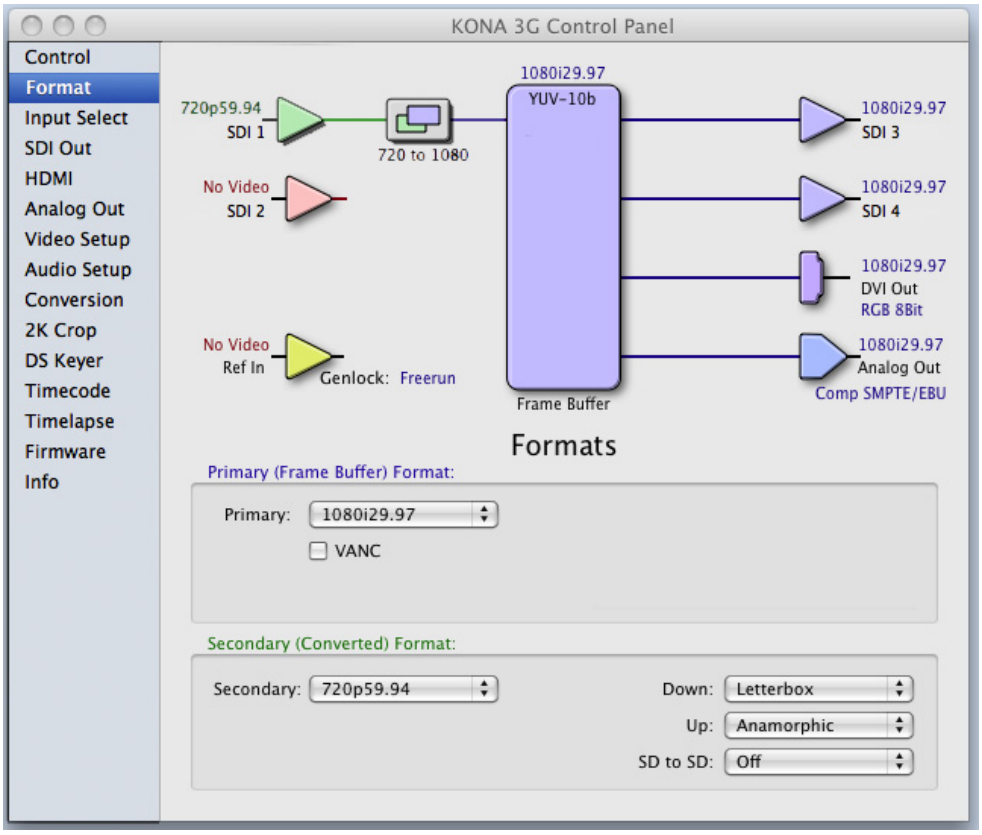
Note: "a" and "b" formats are for use with the two 3G standards. QuadHD refers to a raster size of 3840x2160. 4K refers to a raster size of 4096x2160.

Note: The AJA Control Panel software uses the abbreviation "sf" instead of "psf" when referring to "progressive segmented frame" formats. In the manual and in other literature you may see either of these acronyms used interchangeably. Visually it is easier to discern at a glance if you are working with progressively segmented frame formats (sf in the AJA Control Panel) as compared to progressive frame formats which will show only "p."

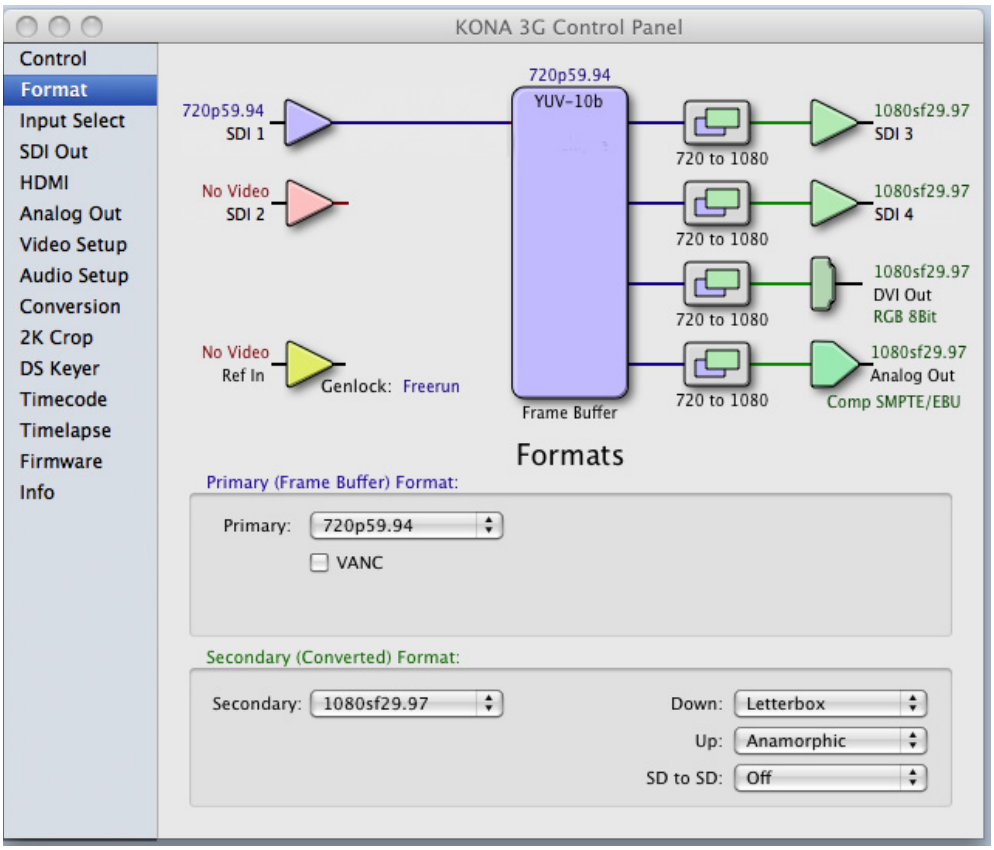
Crossconversion: if you have an HD format as your primary and then select a secondary HD format with a different frame size, the KONA 3G card will perform a crossconversion where necessary (input or output) for "*like Hz*" formats. "*Like Hz*" means that 720P 59.94 may be converted to 1080i 29.97 (59.94Hz). Converting from disparate Hz is not supported on the KONA 3G card for crossconversions. The example below shows 1080i to 720p.



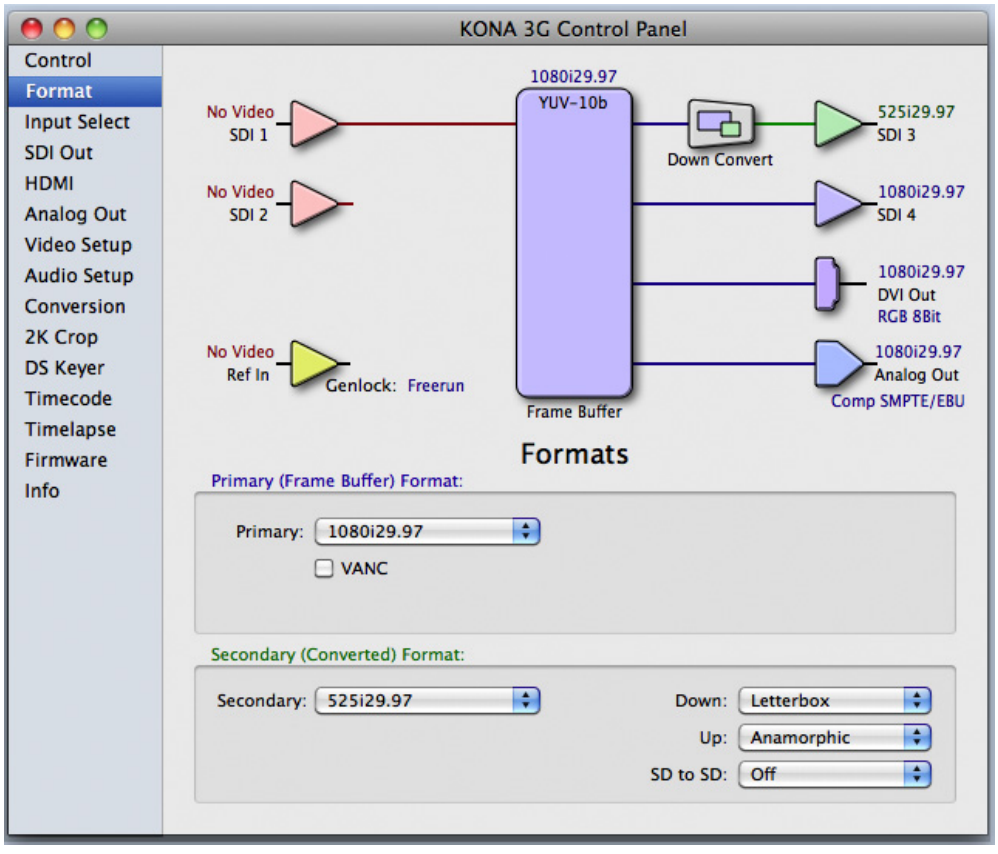
Control Panel, Formats Tab Showing Crossconversion, 1080i to 720p



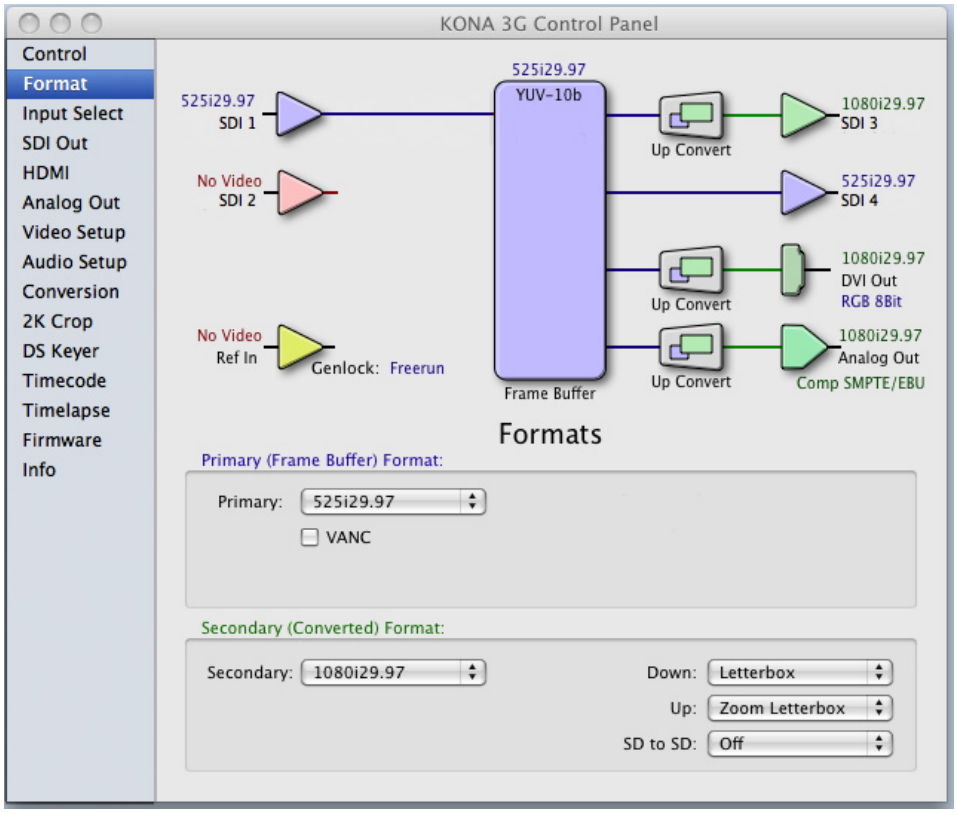
Control Panel, Formats Tab Showing Crossconversion, 720p to 1080i



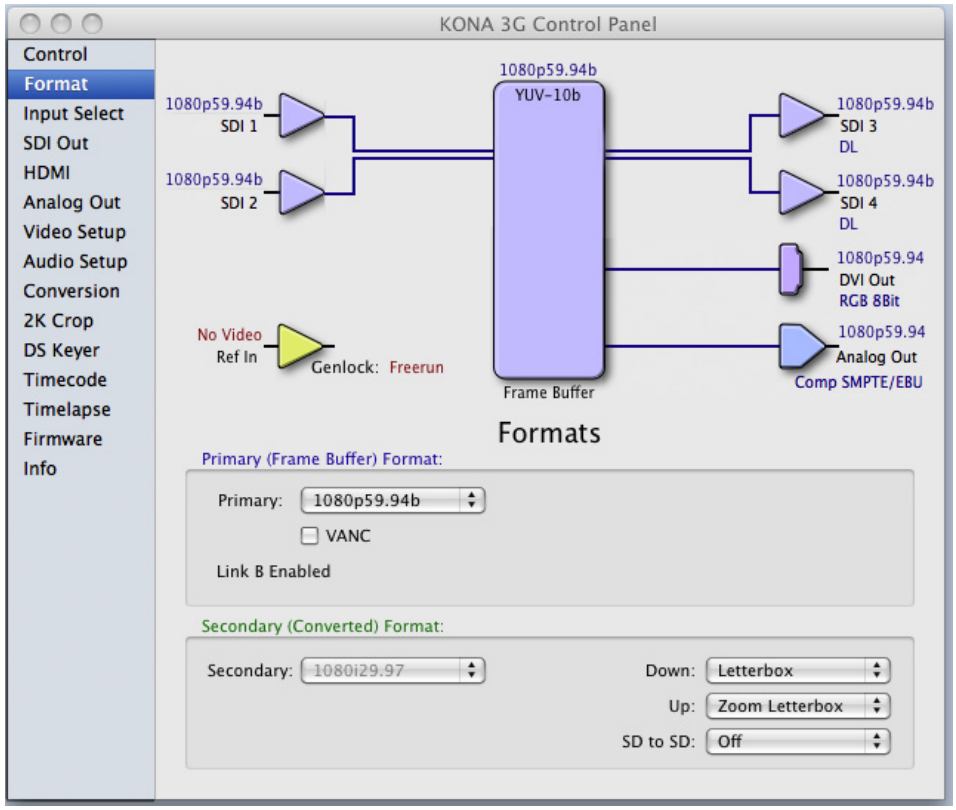
Control Panel, Formats Tab Showing Crossconversion, 720p to 1080PsF



AJA Control Panel, Formats Tab Showing 1080i Downconvert



AJA Control Panel, Formats Tab Showing SD to 1080i Upconvert



AJA Control Panel, Formats Tab Showing Dual-link In/Out (no conversion)

Note: Conversions are only supported under Standard Mode, not under 4K Mode firmware.

Up (Conversion)—the *Up* and *Down* pull-down menus are available when conversion has been selected for the video path to/from the framebuffer and like Hz formats are selected (the one exception is 1080PsF 23.98 which can be downconverted to 525i 29.97.) Different choices will be available depending on the type of conversion and formats being converted. SD to SD conversions are essentially aspect ratio conversions to accommodate transforming anamorphic images to letterbox or vice versa.

For Upconversion the following choices are available:

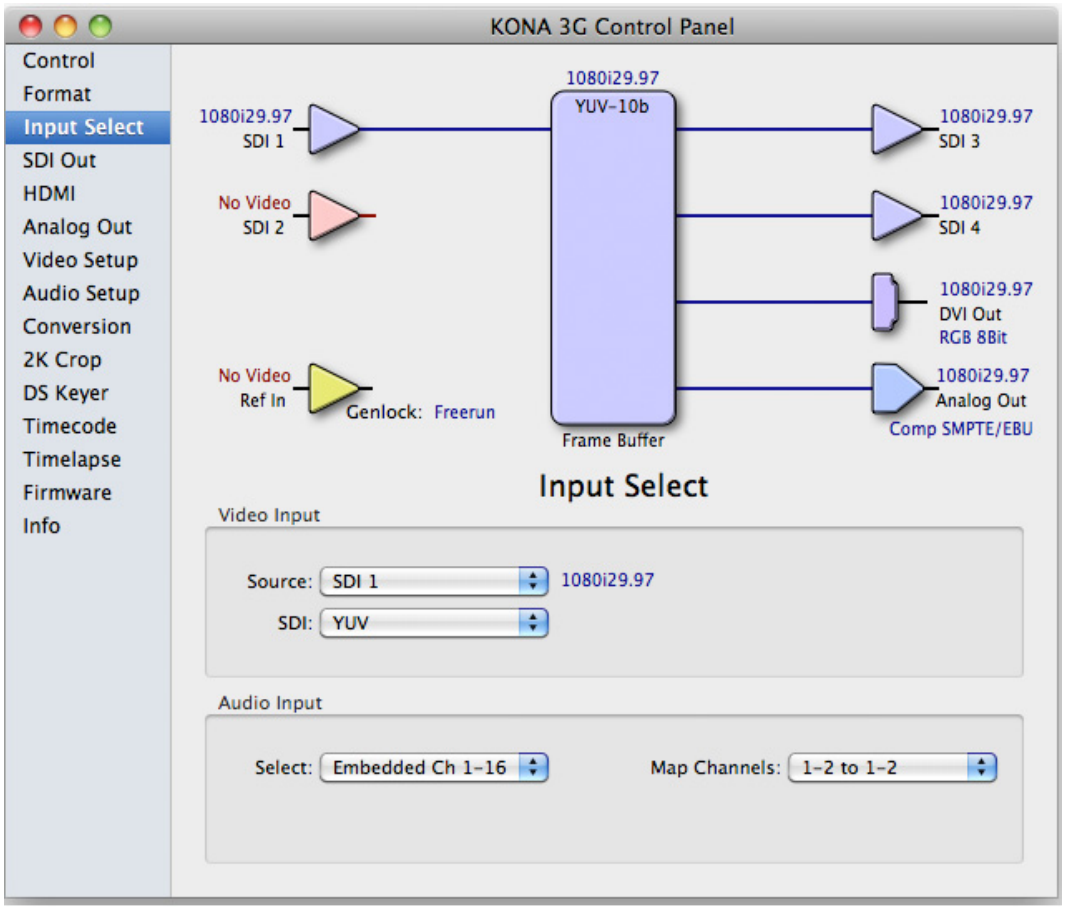
Anamorphic: full-screen "stretched" image
Pillar box 4:3: results in a 4:3 image in center of screen with black sidebars
Zoom 14:9: results in a 4:3 image zoomed slightly to fill a 14:9 image with black sidebars
Zoom Letterbox: results in image zoomed to fill full screen
Zoom Wide: results in a combination of zoom and horizontal stretch to fill a 16:9 screen; this setting can introduce a small aspect ratio change

Down (Conversion)—for downconversion the following choices are available:
Letterbox: image is reduced with black top and bottom added to image area with the aspect ratio preserved
Crop: image is cropped to fit new screen size
Anamorphic: full-screen "stretched" image

SD to SD—this pulldown is for SD to SD aspect ratio conversion.
Letterbox: this transforms SD anamorphic material to a letterboxed image.
H Crop: will produce a horizontally stretched effect on the image; transforms anamorphic SD to full frame SD
Pillarbox: will produce an image in the center of the screen with black borders on the left and right sides and an anamorphized image in the center
V Crop: will transform SD letterbox material to an anamorphic image

Input Select Tab Screen

On the Inputs screen you can view the currently selected video and audio input sources and map audio sources to the channels supported by Final Cut Pro (more on this later). Two information panes in the screen are provided: Video Input and Audio Input.



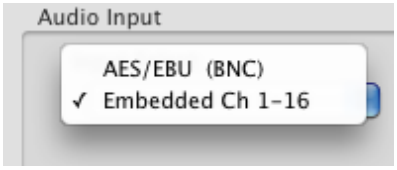
AJA Control Panel, Inputs Tab

Input Select Tab Settings

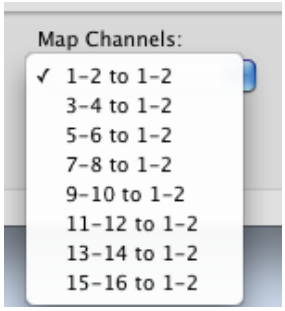
Video Input—the pulldown menu allows you to see and change what's currently selected and the video format that KONA 3G has detected (if any). In the example shown previously, it shows that video is selected at the SDI 1 input and the format is 1080i with a frame rate of 29.97. Since this text is shown in blue, you can tell that it matches the framebuffer's primary format selected in the “Formats” screen. By looking at the input source, you can determine how the primary format should likely be set (unless you want to perform a conversion on input.) If you wish to select a different input use the pulldown to select either SDI 2 or Dual Link if your source is 4:4:4 RGB or Stereo 3D.

Audio Input—this pulldown menu allows you to pick where the audio comes from. KONA 3G supports up to 8 channels of AES via XLR (or BNC on the K3G-Box) or 16 channels of SDI embedded audio. You can choose out of the 16 channels embedded in the SDI, and pick which 8 to bring in (1-8 or 9-16). Here you can also select which two channels from the 8 embedded would be mapped to Final Cut's if only two channels were selected in the application. FCP 5 and higher supports multi-channel input and output so you may elect to select up to all 16 embedded audio channels.

When a KONA 3G has a Breakout Box attached, there are two ways to connect AES/EBU inputs: XLR or BNC connectors. The Audio Input pulldown allows you to select which of the two connector groups will be used. If you digitize footage and find that there is no audio present on the captured footage, it may simply be because the audio selection in the KONA Control Panel is set to AES/EBU (BNC) when in fact you are connected via AES/EBU (XLR).



Audio Input Select Choices



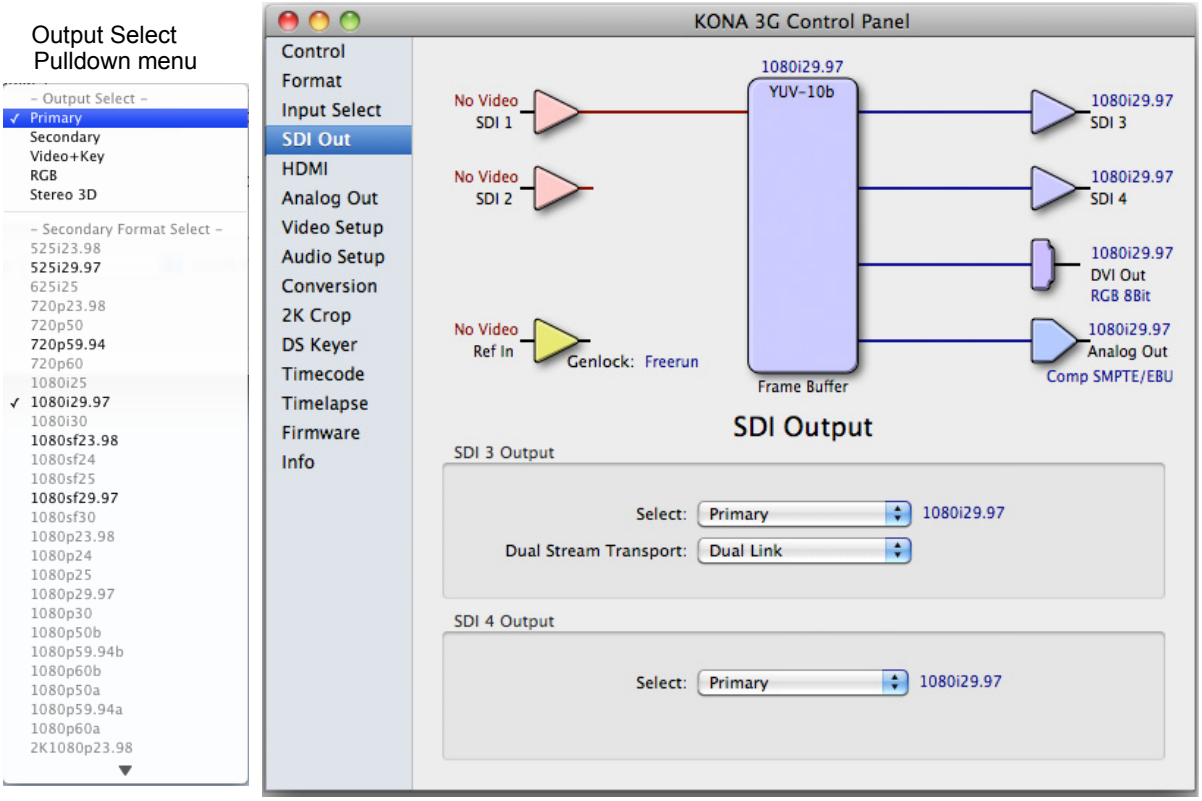
Audio Map Channel Choices

SDI Output Tab Screen

The SDI Output tab shows the current settings for both of the SDI outputs. Because the outputs can be configured independently, one output may be the Primary format and the other output may be the Secondary format. If an input/output has no video, it will be indicated on the block diagram ("No Video").

SDI Output Tab Screen Settings

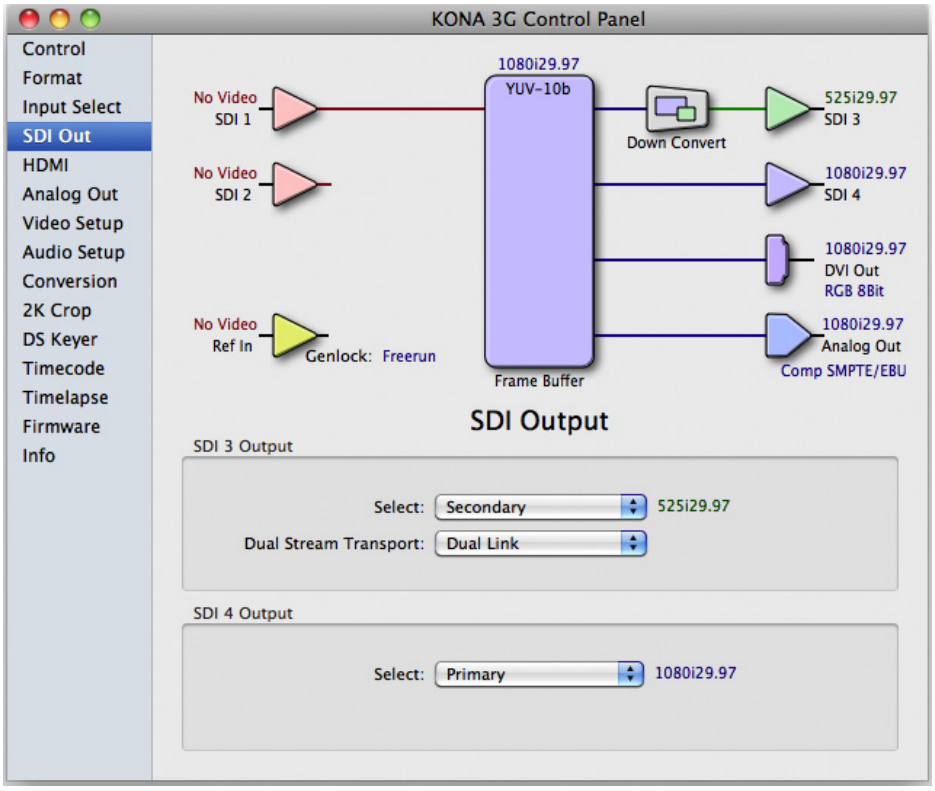
Separate information panes will be listed (as applicable) for SDI Outputs 3 and 4. Information that can appear includes the following items. You can view the current setting or select another from the pulldown menu to change to it:



AJA Control Panel, SDI Output Tab

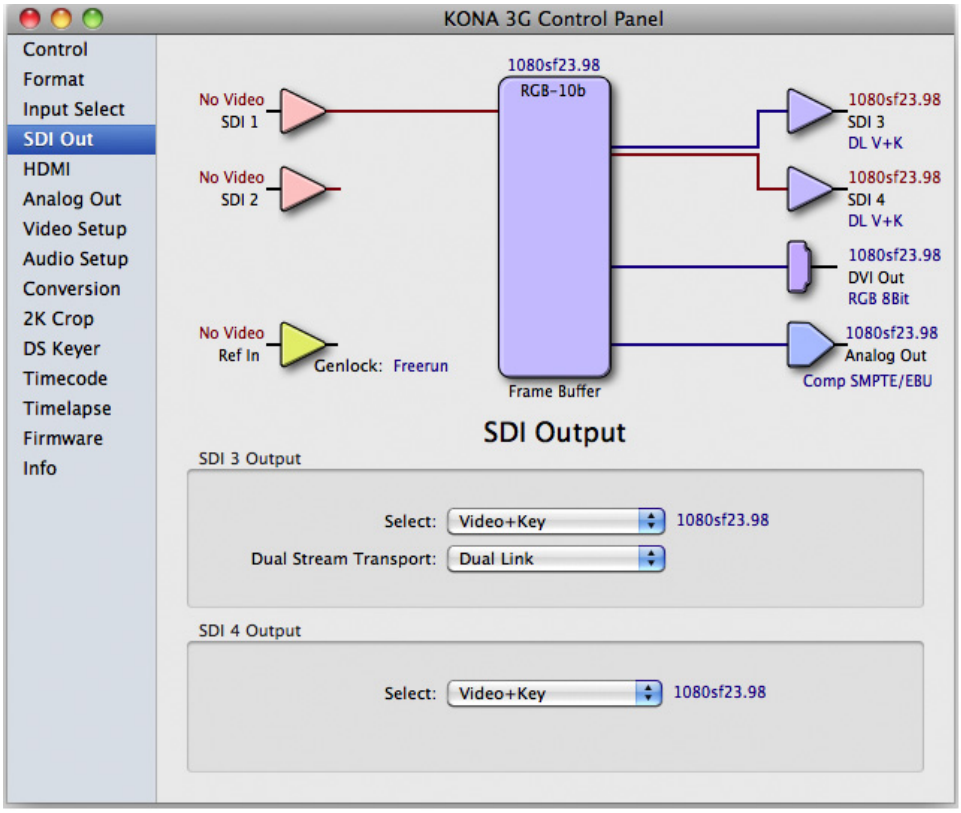
Primary—when selected, this indicates that the SDI output is set to the same format as the framebuffer. That value will be listed in blue.

Secondary—when selected, this indicates that the SDI output is set to a format different from the framebuffer (Primary Format). That secondary format value will be listed in green. This shows that active processing of the video is taking place (format change and possibly even up/down-conversion).

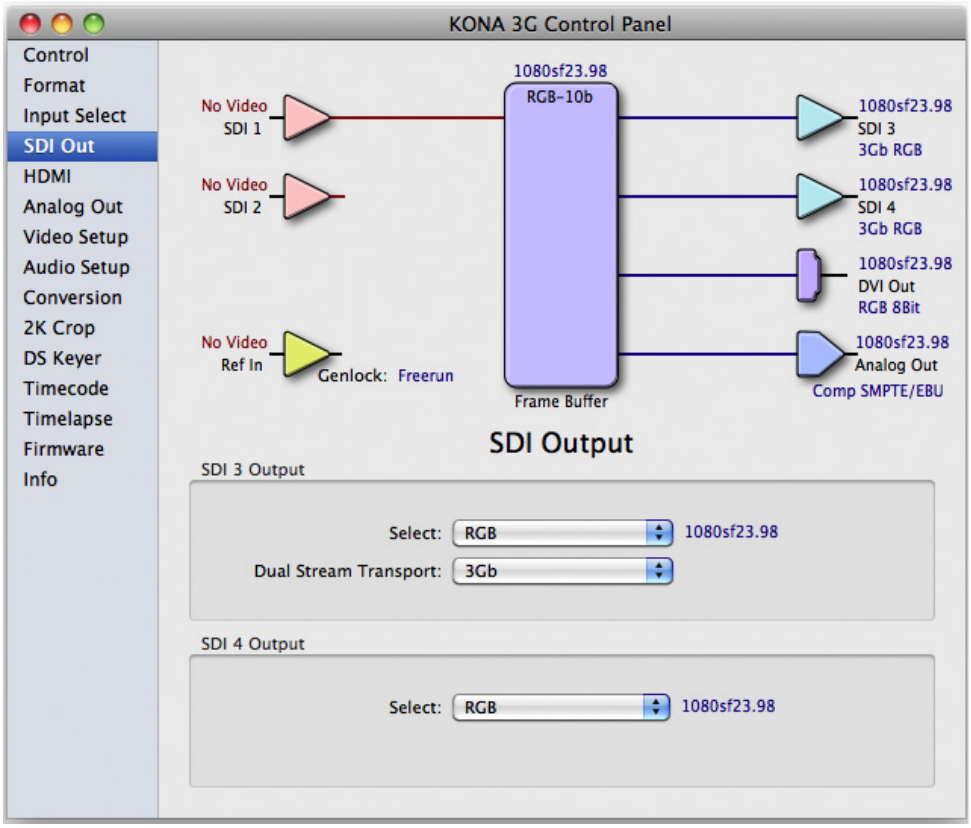


AJA Control Panel, SDI Output Tab, Secondary Downconvert

Video+Key—when selected, this indicates that the SDI 3 video is set to the same format as the framebuffer. SDI 4 is set to a video key signal associated with SDI 3 (the shape to be cut out from the video - this will appear as a black and white image/matte). Using the second KONA output as an Alpha Channel key, with the video output, may be useful for feeding production switchers, DVEs or other professional video equipment. If Video+Key has been selected as an output, the block diagram will indicate the SDI outputs with video in blue and the key in red.



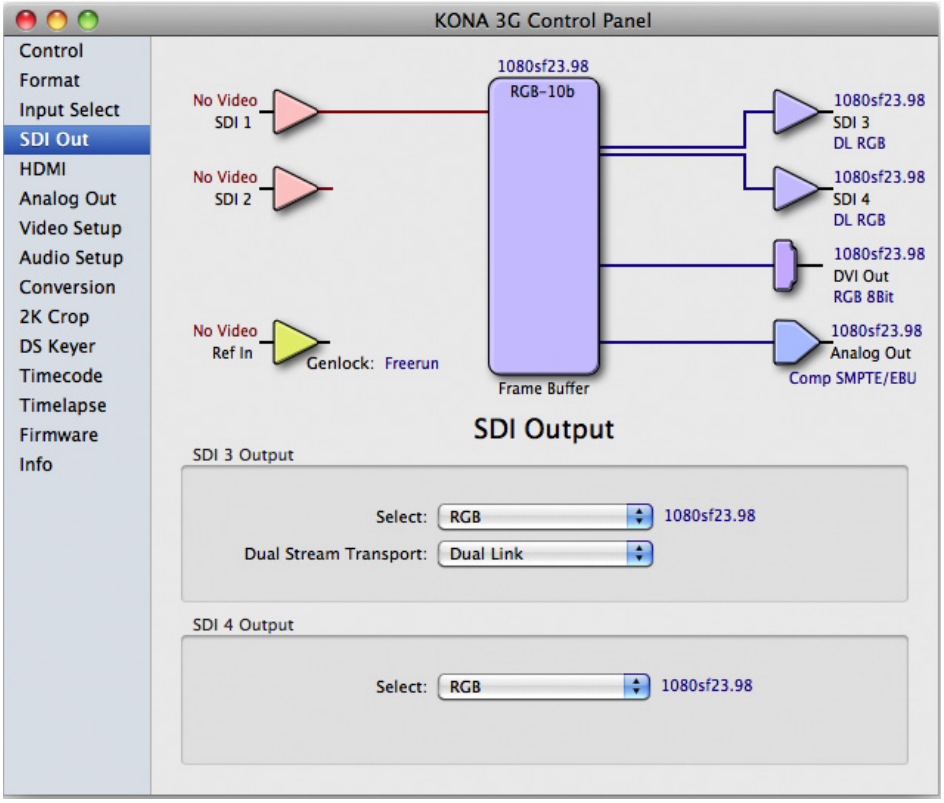
AJA Control Panel, SDI Output Tab, Video + Key



AJA Control Panel, SDI Output Tab, 3G Transport

RGB 4:4:4—high data-rate RGB can be output using either:

- Dual Link (SMPTE 372M) using SDI 3 and SDI 4 in concert or
- single link 3Gb (SMPTE 424M) transport (shown).

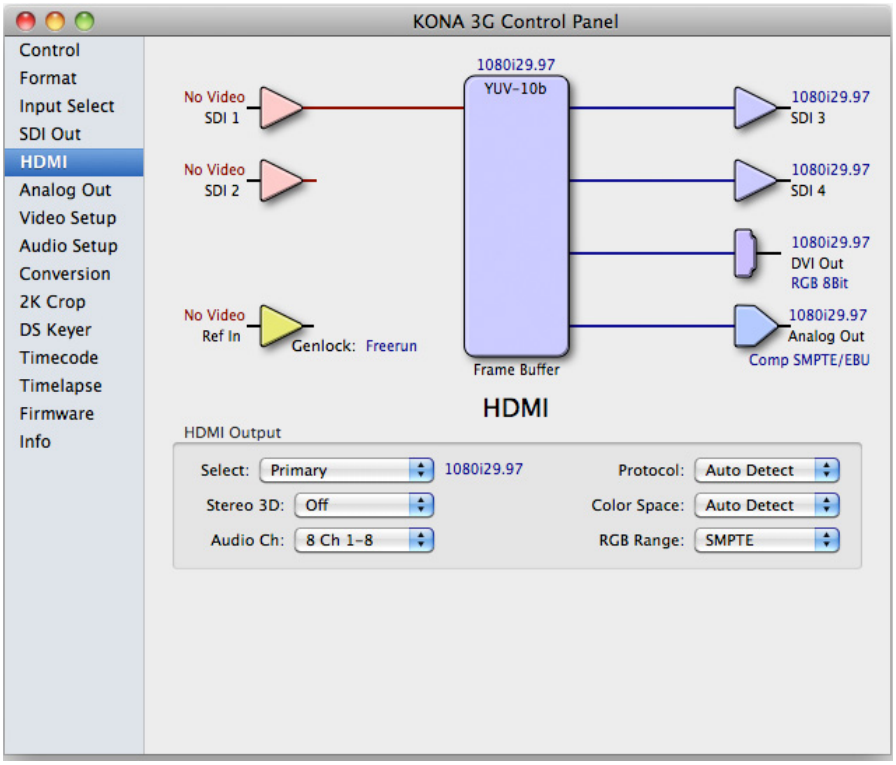


AJA Control Panel, SDI Output Tab, Stereo

Stereo—when selected in Dual Link, this indicates that SDI 3 represents the left eye output and SDI 4 represents the right eye output of stereoscopic material.KONA 3G also offers single link 3Gb output of multiplexed Stereo 3D

HDMI Output Tab Screen

The KONA 3G's HDMI output is shown and configured at this tab screen.



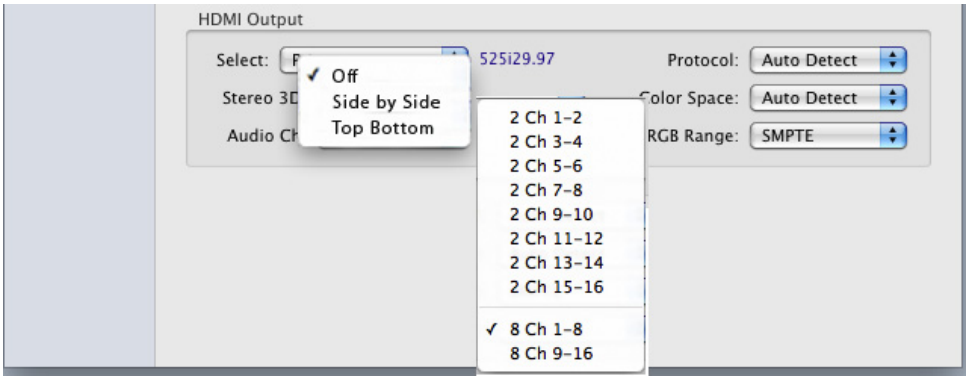
AJA KONA 3G HDMI, HDMI Tab

HDMI Output—One set of radio buttons allow you to select either the primary video format (framebuffer) or a secondary one (up/down/cross-conversion). Pulldowns are provided for configuring the video output range, color space and number of embedded audio channels (2 or 8) for the HDMI output. A Protocol pulldown allows you to choose either "HDMI" or "DVI" protocol—use DVI if you're outputting to a DVI monitor using an HDMI to DVI adapter.

Stereo 3D—The pulldown menu for 3D output allows you to select either Side-by-Side or Top-Bottom (Stacked) output of left-eye and right-eye signals.

Note: This selection must agree with format selection in the third-party CineForm Codec (**NOT** included with AJA KONA 3G) pulldown menu.

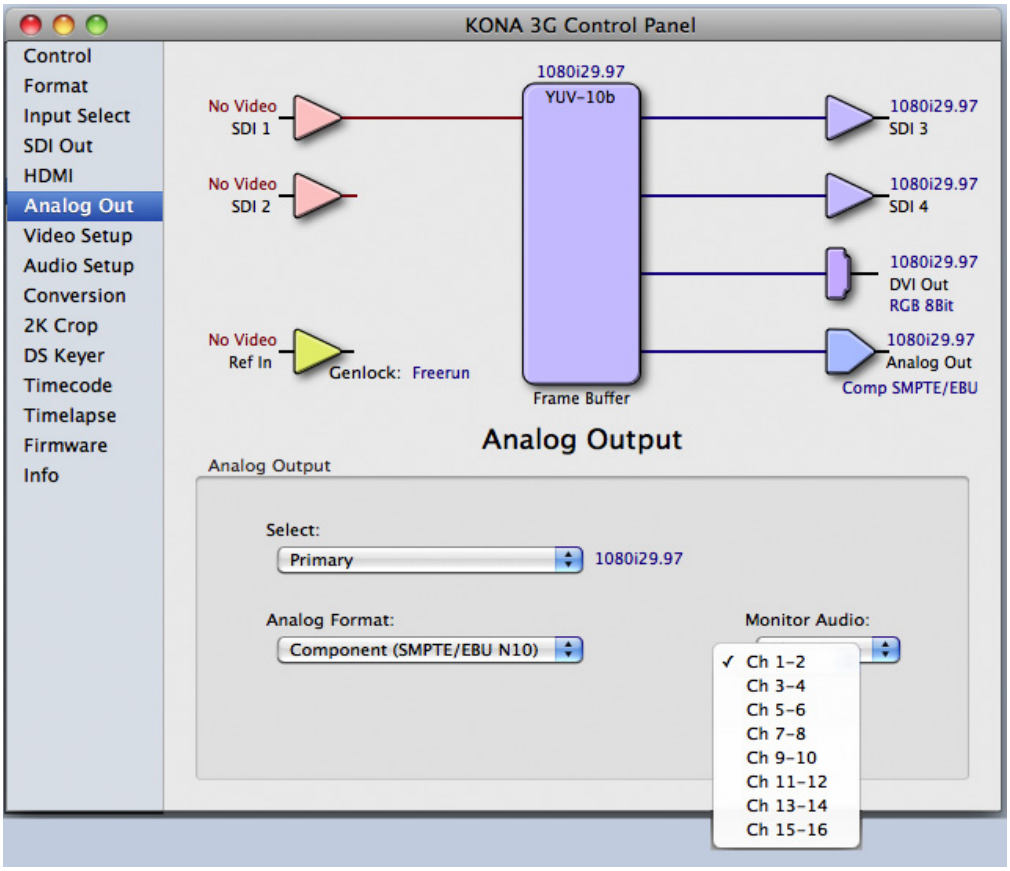
Audio Channels—The Audio Channel pulldown allows you to select the number of embedded audio channels for the HDMI output



HDMI Output Formatting

Analog Out Tab Screen

KONA 3G provides a high-quality analog component or composite + Y/C output, generally used for monitoring. This screen shows the current settings for that analog output, and allows you to re-configure it when desired (format and black-level).



AJA Control Panel, Analog Out Tab

Analog Out Tab Screen Settings

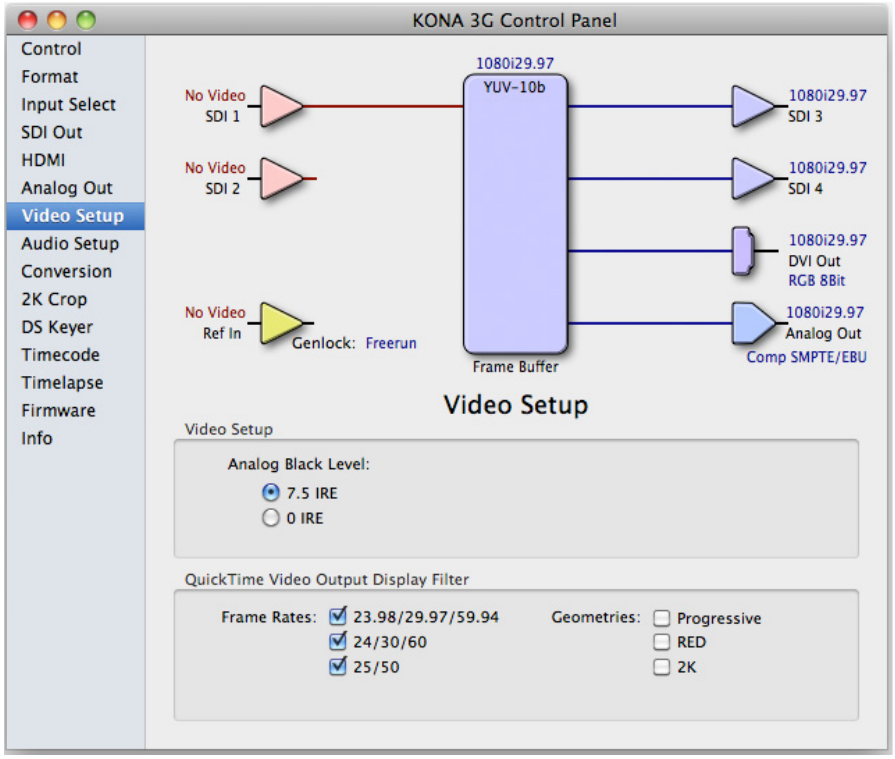
Analog Output Format—choices in the Analog Format pulldown menu vary depending upon the Analog Output video standard. For example, the "Composite + Y/C" selection is only available when an SD (525i29.97 or 625i25) format is in use. Analog formats can include:

Composite +Y/C (one composite output *and* a simultaneous Y/C (S-Video) output)
Component (SMPTE/EBU N10)
Component (Beta)
Component (RGB)

Monitor Audio—here you can select which two channels will be mapped to the analog audio output (K3G-Box only).

Video Setup Tab Screen

KONA 3G provides a high-quality analog component or composite output, generally used for monitoring. This screen shows the current settings for that analog video output, and allows you to re-configure it when desired.

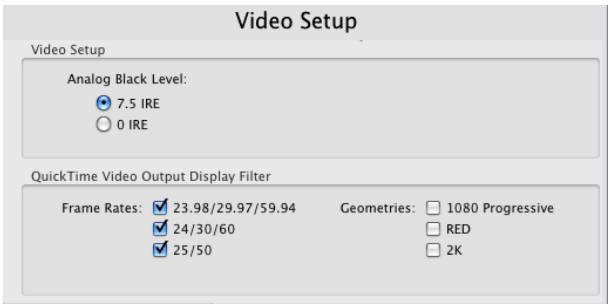


AJA Control Panel, Video Setup Tab

Setup Tab Screen Settings

Analog Black Level—choices available for Black Level are the two Composite analog formats. Choices presented are for US or Japan:
7.5 IRE (NTSC US)
0 IRE (NTSC Japan)

QuickTime Video Output Filter—The QuickTime Video Output Display Filter is designed to help manage the comprehensive list of video outputs that may be available to applications, particularly Final Cut Pro's *A/V Devices* tab.



By selecting the checkbox next to specified parameters, the video outputs related to these specified parameters are enabled as possible video outputs for applications. For example, if the checkbox next to *25/50* is unchecked, 50Hz video outputs are deselected and would not be available to the user in the *A/V Devices* tab of Final Cut Pro. To avoid confusion when working in a particular editorial environment, users might elect to leave

50Hz unchecked if they work solely in a 60Hz editorial environment. The same might be true for users who do not intend to work with true progressive 1080 material.

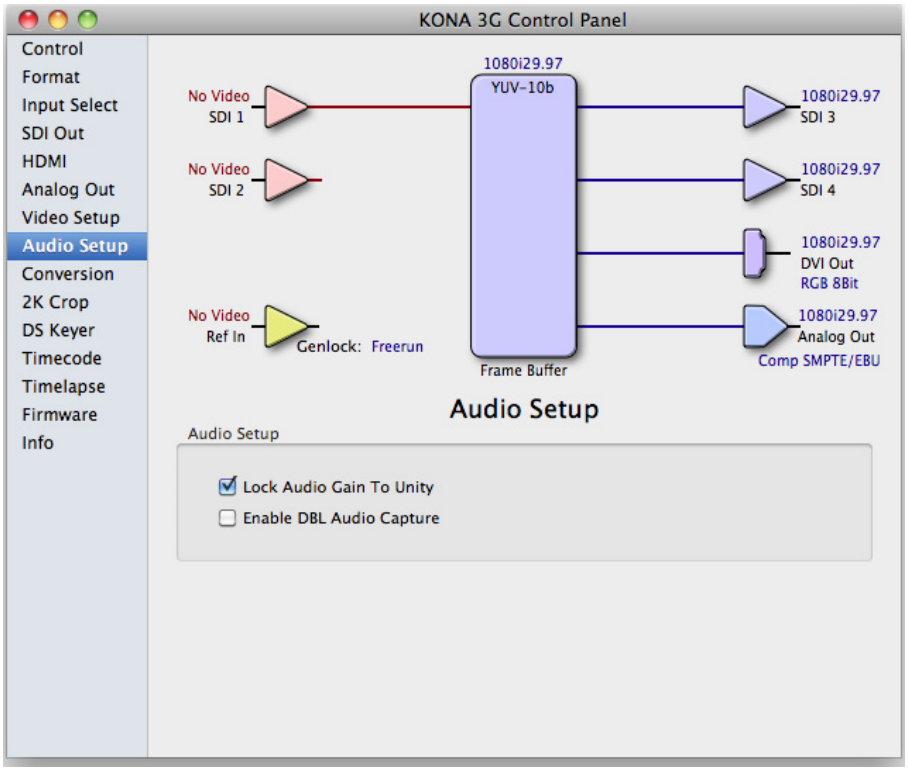
Note: If a prompt occurs in Final Cut Pro stating that the AJA output device is missing, this may be due to the Active Video Filter for a given parameter being unchecked for the format selected in the application. If this occurs, make the appropriate selection in the Control Panel application and re-enter Final Cut Pro where the selection should now be available.

Also you should manage the selections in this checkbox list for the specific formats used in your particular edit session. If you use too many selections, you might still get the above Final Cut Pro prompt.

The *RED* checkbox is designed to enable video output support for the unique geometries associated with RED proxy files or media transcoded from RED source R3D files. Without this checkbox enabled, playback of RED footage (proxy or transcoded files) will require Final Cut Pro to handle the scaling of the video to a standard video output size, such as 1920x1080.

Audio Setup Tab Screen

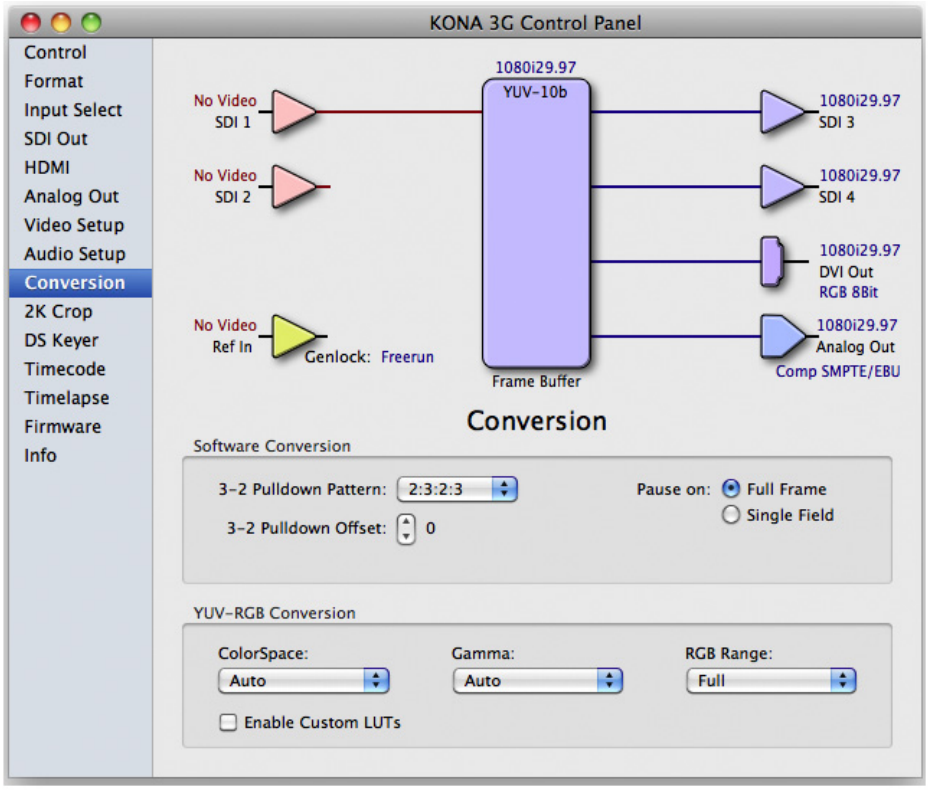
This screen shows the current settings for that analog audio output, and allows you to re-configure it when desired. For details on DBL double-speed transfer settings, refer to *"Double Speed Transfer for KONA 3G and Sony HDCAM SR" on page 26*.



AJA Control Panel, Audio Setup Tab

Conversion Tab Screen

This screen offers controls that determine how the card behaves under Final Cut Pro.

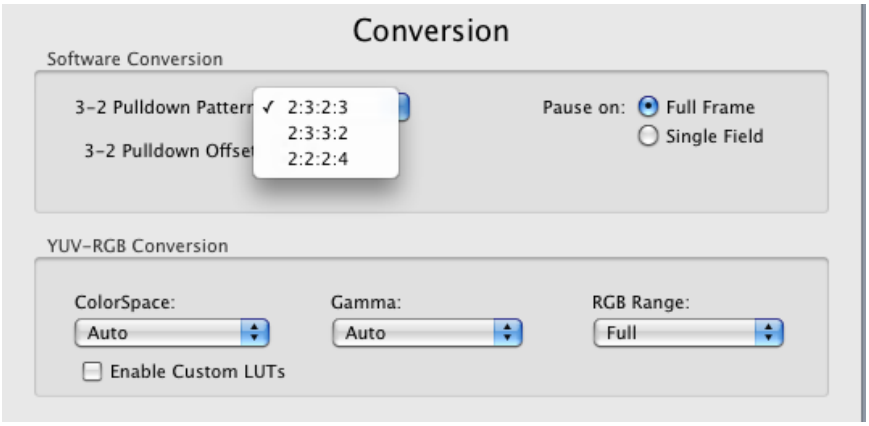


AJA Control Panel, Conversion Tab

Conversion Tab Screen Settings

Pause On—these two choices determine what happens when Final Cut Pro is paused in stop mode:
Full Frame: both fields are displayed resulting in some jitter while paused.
Single Field: a single field is displayed, showing no flicker (useful when color correcting or whenever the flickering would be a distraction).

Software Conversion—the value selected in this pulldown is used whenever, due to format selection, you've chosen to do 24 frames-per-second to 30 conversion where extra fields will be added to pad the existing ones. Depending on video content, selection of different field patterns may be useful in reducing jitter due to the content of adjacent fields. The numbers in the pattern choices specify the frequency with which inserted fields will be repeated. For example, "2:3:2:3" means duplicate a field twice, then the next field three times, then the next twice, and then back to three times.



AJA Control Panel, Codec Tab, Frame-padding Pattern Choices

YUV-RGB Conversion: These pulldowns select industry standard color space and gamma transfer functions for the YUV-RGB conversion, or allow you to direct the KONA card to automatically determine it for you.

Colorspace—choose from:
Rec 601
Rec 709
Auto

Gamma—choose from the following:
Linear (1.8)
Rec 601 (2.20)
Rec 709 (2.22)
Auto

RGB Range—The RGB Range pulldown menu allows you to select either Full range (0-1023) or SMPTE range (typically 64-940) for RGB color output.

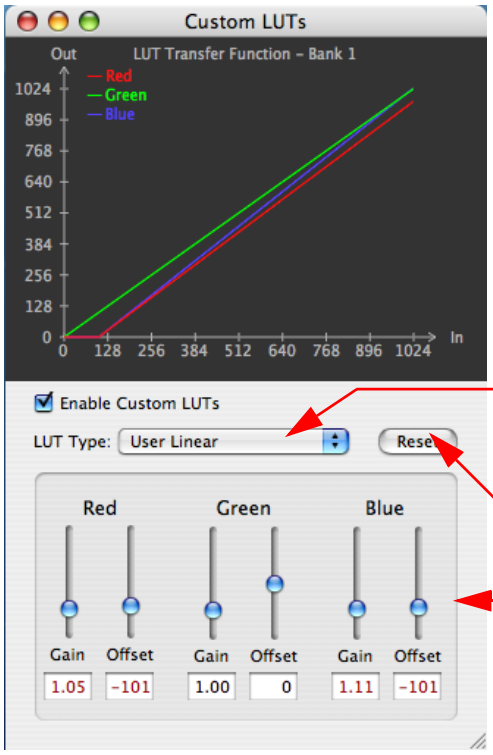
Enable Custom LUTs—this checkbox enables a custom color lookup table (LUT) for use in Final Cut Pro. When checked, there will be a new "Custom LUT" menu item under the *Windows* menu in the KONA Control Panel. Selecting that item brings up the "Custom LUTs" dialog shown on the following page. Defining a LUT applies it to the KONA 3G output. The custom LUT will be saved with the Final Cut Pro presets. 1D LUTs are supported for import, but not 3D LUTs.

The KONA 3G has an additional window in the KONA Control Panel for Custom LUTs. In this window there is a pulldown where users see choices like Linear, User Linear, etc. In this list is "Load File..." AJA can only support 1D LUTs, not 3D LUTs—and 1D LUTs should be considered appropriate for viewing purposes and tape mastering to video, but *not* for hyper-critical color correction where the goal is to go back to film. In these cases a hardware or software application that can use 3D LUTs would be more appropriate. 1D LUTs can be created or obtained from a number of companies including Kodak and Thomson Grass Valley, to name a few. Often a 1D LUT can be derived from a 3D LUT, so you still will have an accurate reference for viewing and video mastering.

LUTs have two major parameters to remember: they are for turning material from its raw form to a viewable representational form, and they should also be calibrated for the device being displayed upon: LCD, CRT or projector.

The AJA Custom LUT supports the loading of a tabbed text file which could be created in either an application like TextEdit or Microsoft's Excel. The document would consist of 3 columns representing 1024 values for each of the R, G and B columns.

Note: Custom LUTs only work with RGB material.



Select a “canned” LUT or create your own

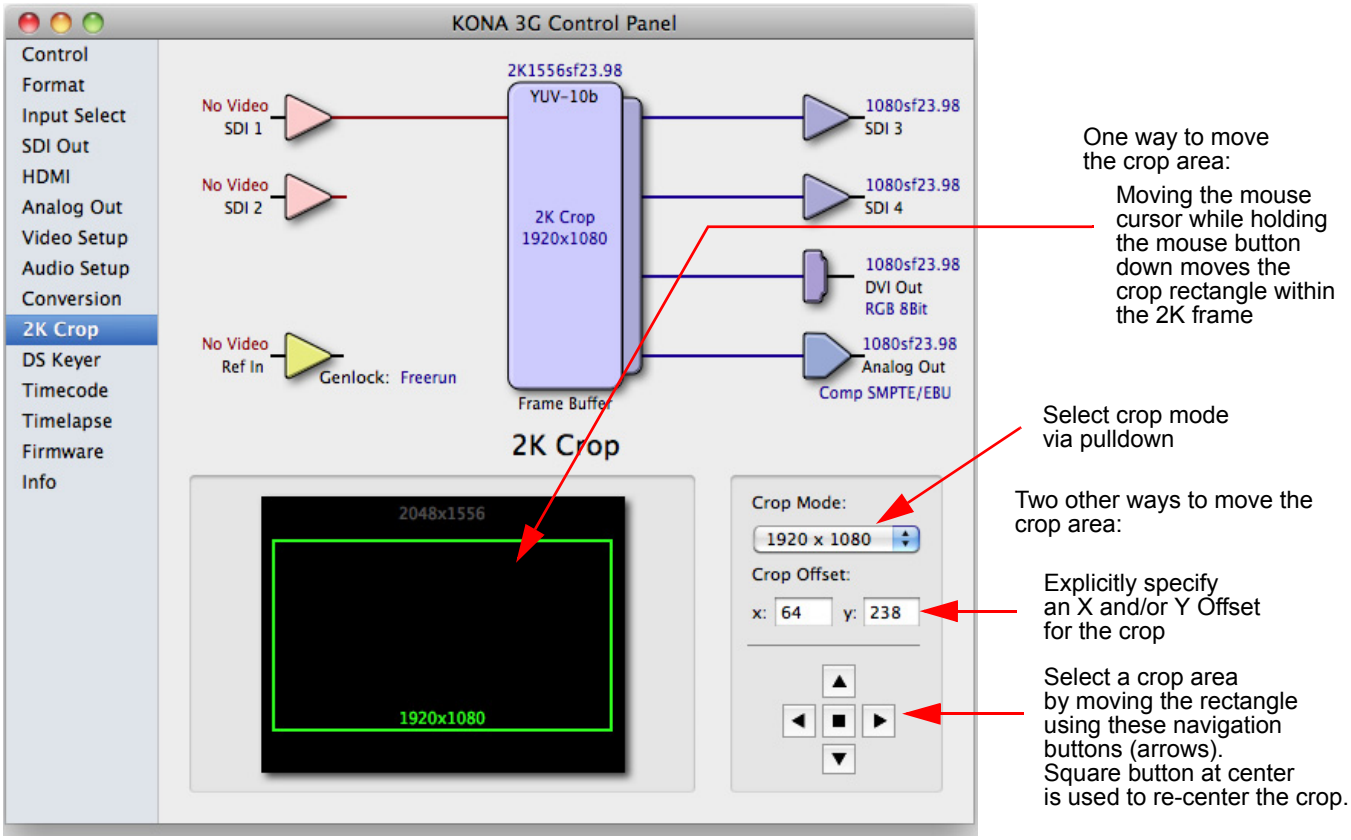
Click to restore factory defaults

Adjust Gain & Offset sliders to change color. Changed values will appear in red in text fields. You can also enter specific numbers to explicitly set a value.

KONA 3G Custom LUTs Dialog

2K Crop Tab Screen

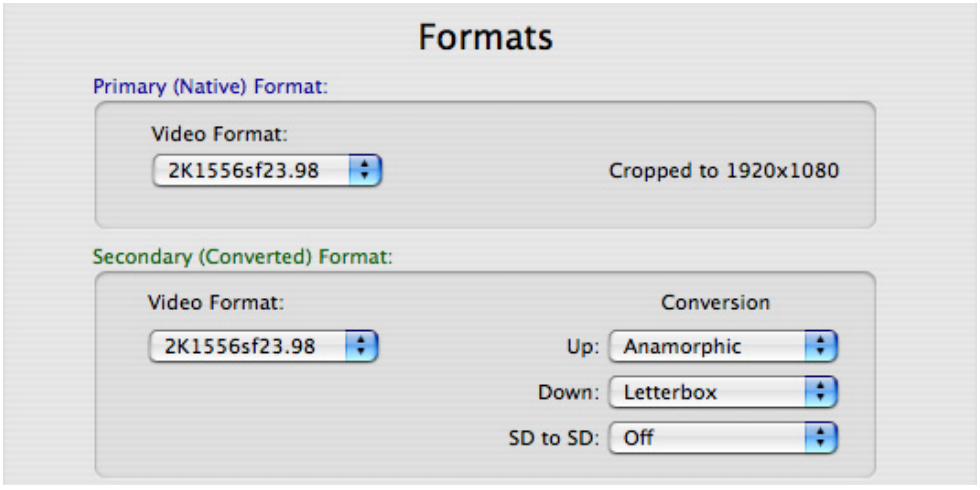
This Tabbed screen allows you to determine how 2K frames captured with VTR Exchange and brought into Final Cut will be cropped. You can select a crop mode and then pan and scan around to choose the area that will be displayed. This can be done dynamically with a mouse or by entering explicit numbers



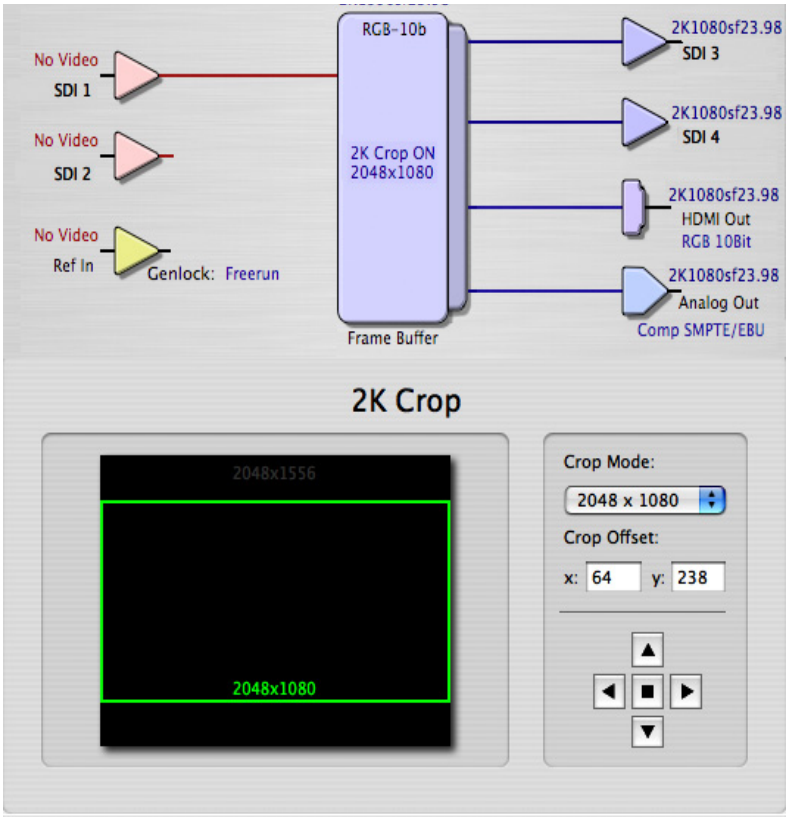
AJA Control Panel, 2K Crop Tab, 2K Crop to 1080PsF from Film Raster

Select a crop mode by choosing 1920 x 1080 or 2048 x 1080 from the pulldown menu; choosing "Off" turns off 2K frame cropping.

In the Format Tab window, this corresponds to:



Here's another 2K crop, this time showing cropped output to a 2K projector:



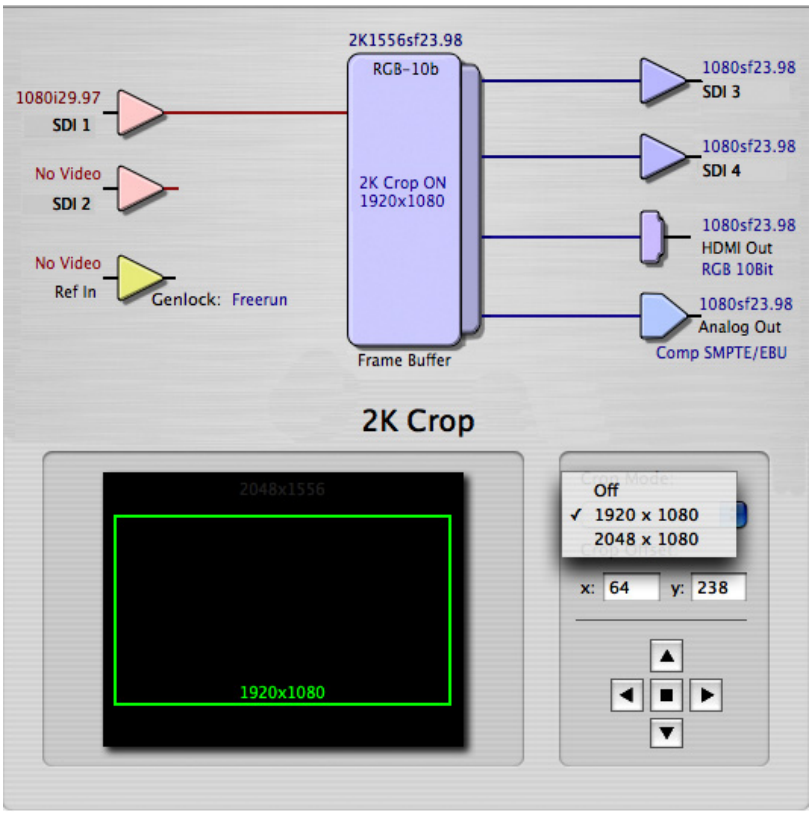
AJA Control Panel, 2K Crop Tab, Showing a 2K Crop to 2K Projector

In the Format Tab window, this corresponds to:

Once a crop is selected, KONA 3G defaults to the crop being placed in the center area of the 2K frame. You can change or move the cropped area from within the frame by selecting the green rectangle with the mouse cursor and dragging it to a desired spot.

> **Tip:** Using the Command key held down in conjunction with the mouse cursor within the Control Panel 2K Crop screen—while in another application (i.e., Final Cut)—allows that application to retain control of the KONA output while adjusting the crop. This is highly useful for visualizing the changes you're making.

Or, you can also use the arrow buttons at the right of the screen to move the crop area up, down or sideways. The square button in the center returns the crop area to the center of the screen. Alternatively, you can also enter a specific X and/or Y pixel offset by typing a number into the text fields above the arrow buttons.



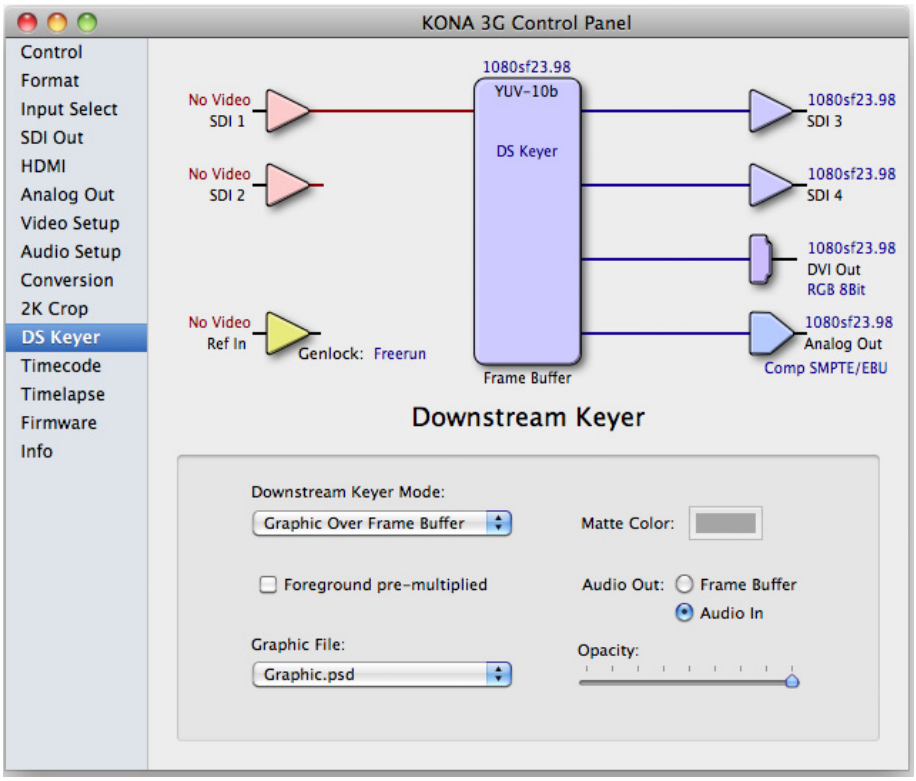
AJA Control Panel, 2K Crop Tab, Selecting Crop Mode

Important Note about 2K: Operational procedures and information for working with 2K workflows are presented in Appendix C at the back of this manual. 2K workflows are unique and require the use of KONA's VTR Exchange software (or DPX/Cineon files) and Final Cut Pro, in conjunction with the 2K Crop features discussed above in the KONA Control Panel.

DS Keyer Tab Screen

The KONA 3G has a hardware-based downstream keyer that is ideal for putting logos, “bugs” or other video material with an alpha channel on top of video being played out or printed to tape. A typical application would be putting a television station's call letters or channel over program video content. Keyed video can be from the KONA's internal Frame Buffer (from storage, video In, KONA TV, etc.) or from a graphics file that has an alpha channel (PhotoShop etc.).

Note: The Downstream Keyer is for use with Standard Mode firmware, not 4K Mode.



AJA Control Panel, Downstream Keyer Tab

Settings in the DS Keyer tab provide control over how the keyer operates and whether it's turned on or off. Controls and their meanings in the Tabbed screen are as follows:

Downstream Keyer Mode:

Downstream Keyer Off — when this pulldown menu item is selected the downstream keyer will be turned off

Frame Buffer over Matte— places the keyed video with alpha channel currently in the Frame Buffer over a fixed color matte determined by the “Matte Color” setting set separately.

Frame Buffer over Video In—places the keyed video currently in the Frame Buffer over the video input for playout or print-to-tape.

Graphic over Matte—places a graphics file having an alpha channel (chosen in “Graphic File” pulldown) over a fixed color matte determined by the “Matte Color” setting set separately.

Graphic over Video In—places a graphics file having an alpha channel (chosen in “Graphic File” pulldown) over the video input for playout or print-to-tape.

Graphic over Frame Buffer—places a graphics file having an alpha channel (chosen in

"Graphic File" pulldown) over the current contents of the KONA card's Frame Buffer (which might be from storage, video In, KONA TV, etc.).

Matte Color: only available when the pulldown "Frame Buffer over Matte" or "Graphic over Matte" are selected-pressing this button brings up a color selection dialog. The dialog provides a variety of ways to select a matte color including a color wheel, color picker (choose from a location anywhere on the computer screen), numeric sliders, swatches, "crayons", and spectrums. The matte chosen will be used as a video background under the keyed video.

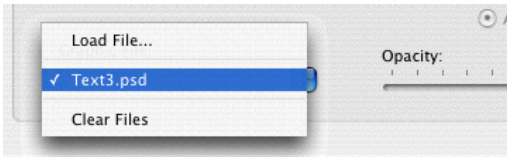
Foreground pre-multiplied (checkbox): use to avoid "matte lines" and improve the appearance of the foreground (key) being composited over the background.

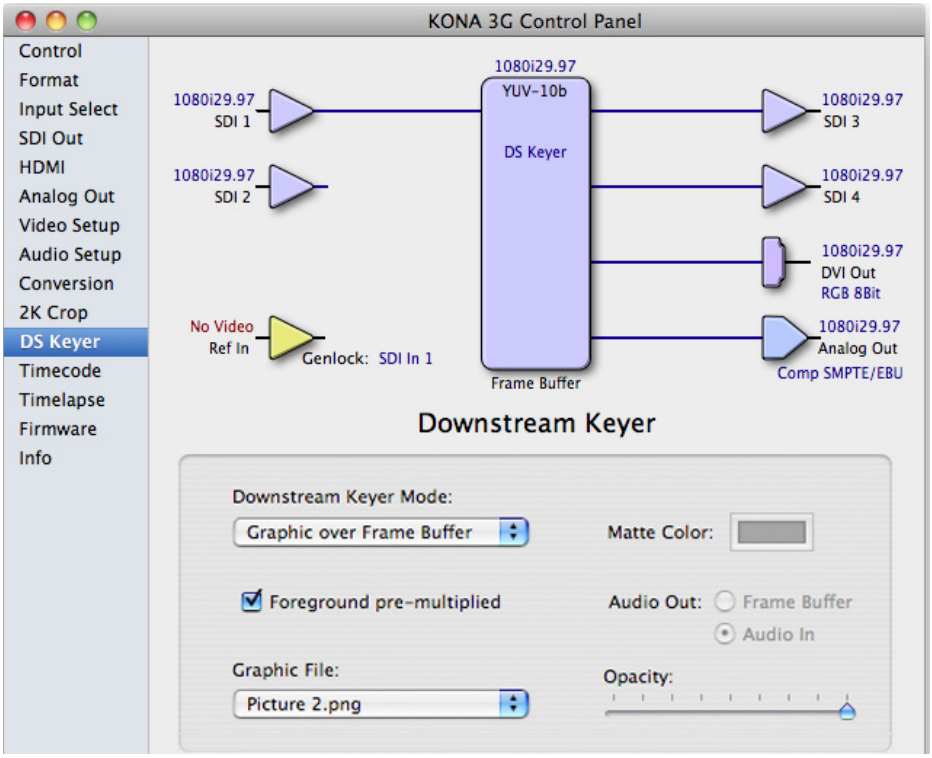
Audio Out:

Frame Buffer—select audio out to be routed from the contents of the Frame Buffer.
Audio In—select audio out to be routed from KONA's currently selected input(s).

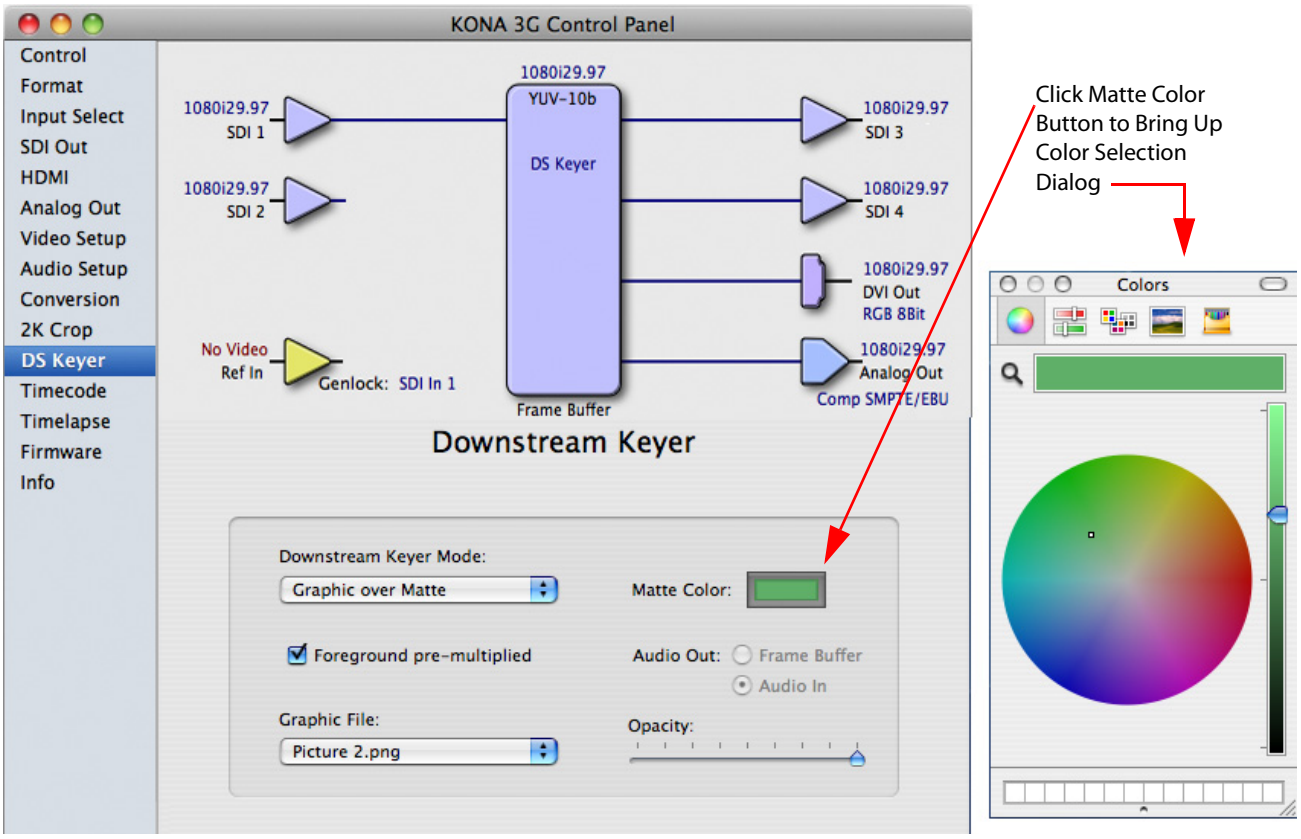
Opacity: this slider controls the transparency of the keyed video (over the background) from translucent to completely opaque.

Graphic File: this pulldown allows you to choose from any recently accessed file or select a new file ("Load File..."), which then brings up a file dialogue. Remember that the file raster (pixel x pixel count) should match the primary format in the frame buffer or the secondary format if upconverting. Example: you wish to key a logo on top of your 1920x1080 footage, the still image with alpha channel that you load should be 1920x1080.





AJA Control Panel, DS Keyer Tab, Loading a Graphic File to Place Over Framebuffer

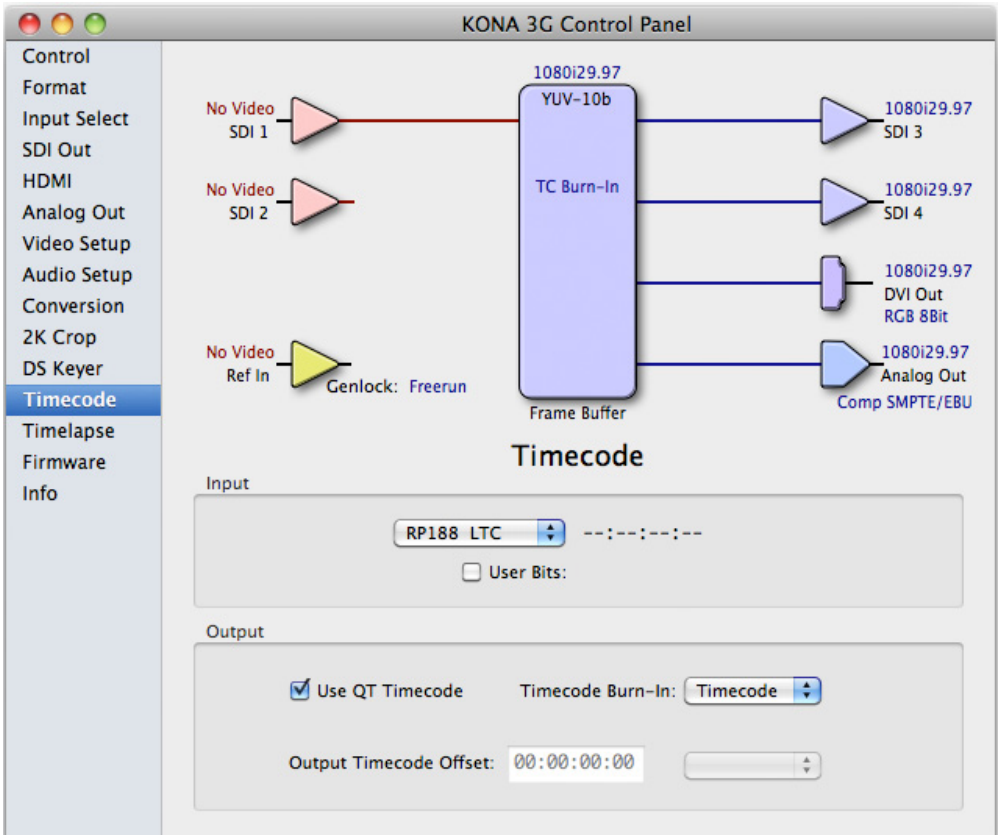


AJA Control Panel, DS Keyer Tab, Loading a Graphic File to Place Over a Matte

Timecode Tab Screen

The timecode screen is used for both monitoring the RP-188 timecode embedded in the digital data stream and for selecting a timecode offset on output (if desired). Settings for the output section of the tab can be used to create window burn superimposed timecode outputs.

Note: SMPTE 12M-2 is the updated name and specification for what was RP-188.



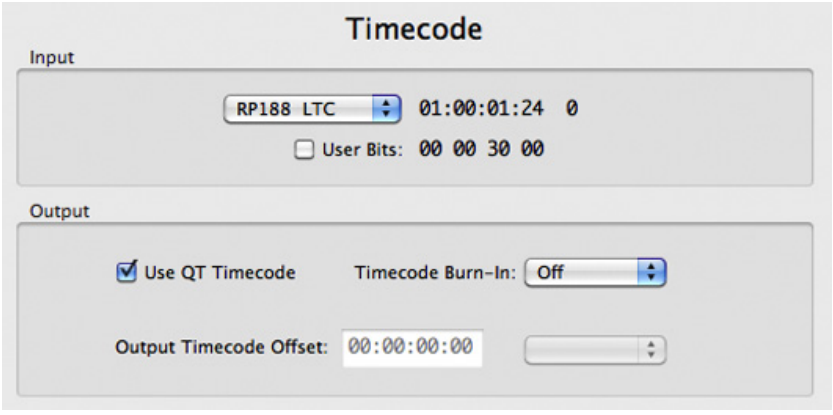
AJA Control Panel, Timecode Tab

Timecode Tab Screen Settings

Input

RP-188 Timecode —in RP-188 timecode (SMPTE 12M-2) there can be multiple timecode values in the data stream. Use this pull-down to select the one you wish to monitor. The selection will be displayed in the timecode value displayed to the right of the pull-down.

User Bits—for monitoring variable framerate timecode (for example, Varicam), you may wish to monitor the user bits embedded in the timecode. If you set this checkbox, KONA 3G will detect and interpret the user bits and display them next to the checkbox.



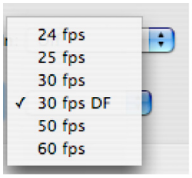
AJA Control Panel, Timecode Tab, User Bits Checked

Output

Use QuickTime Timecode—when checked, this directs KONA to output timecode from the QuickTime timecode track. When not checked, KONA uses the Output Timecode Offset value plus the number of frames into the movie.

Note: not all QuickTime applications use or support timecode tracks, so sometimes the QuickTime timecode is missing or not meaningful.

Output Timecode Offset (entry field and FPS pull-down)—this text entry field allows you to specify a timecode offset for use with Final Cut Pro (or any other application that has timecode offsets that are user-controlled). In FCP, go to "Timeline Options" and locate the "Starting Timecode" value. Use that same value here as the "Output Timecode Offset" to ensure the timecode is synchronized.

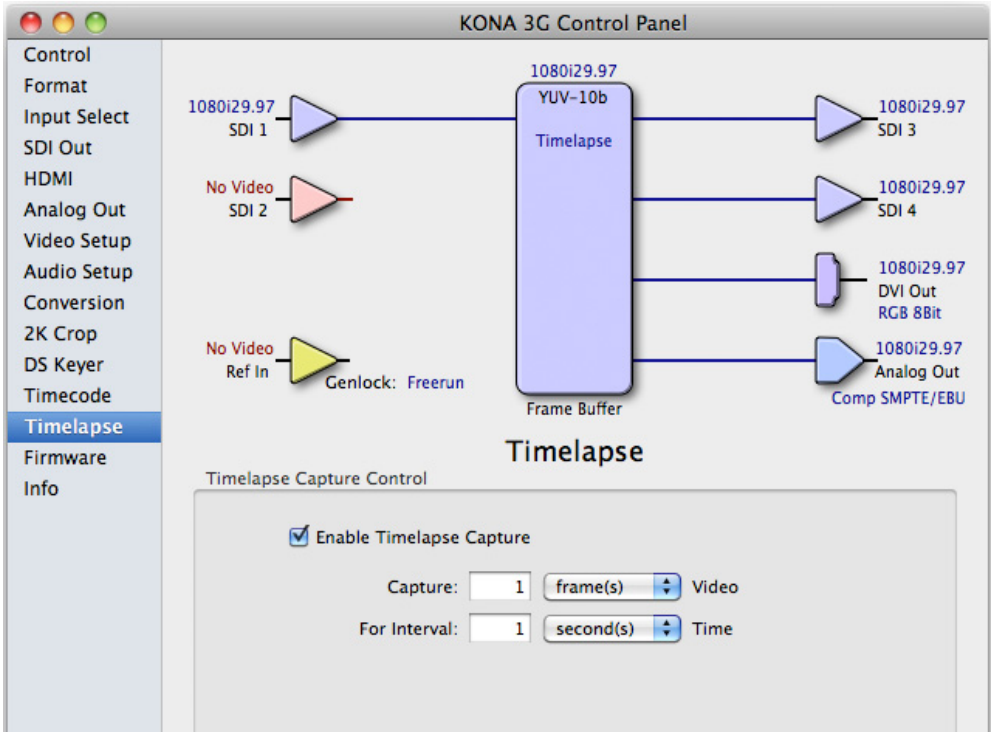


Timecode Burn-in—this pulldown selects whether the timecode value is "burned-in" on video output from KONA 3G. If set to "OFF", timecode will not be keyed over the video. If set to "timecode", then the timecode value will be keyed over the output video. This can be useful for synchronizing, choosing edit points, dailies, and many other purposes.

Note: SMPTE RP 188/SMPTE 12M-2 defines a standard for the transmission of time code and control code in the ancillary data space of a digital television data stream. Time code information is transmitted in the ancillary data space as defined in ANSI/SMPTE 291M. Multiple codes can be transmitted within a single digital video data stream. Other time information, such as real time clock, DTTR tape timer information, and other user-defined information, may also be carried in the ancillary time code packet instead of time code. The actual information transmitted through the interface is identified by the coding of a distributed binary bit. Equipment manufacturers can use the meta data for different purposes.

Timelapse Tab Screen

This Tabbed screen is used for the KONA 3G timelapse feature. To use the timelapse capability, choose the "Enable Timelapse Capture" checkbox. This functionality is enabled for all QuickTime capture applications (Final Cut Pro, VTR Xchange, etc.) Set the "Capture" and "For Interval" parameters as desired. Launch a capture application like Final Cut Pro, select the desired Easy Setup for the video format desired. You will not need to change anything within the application; the timelapse feature will produce QuickTime files with the framerate specified by the Easy Setup used. The resulting timelapse clip can be used without additional rendering.



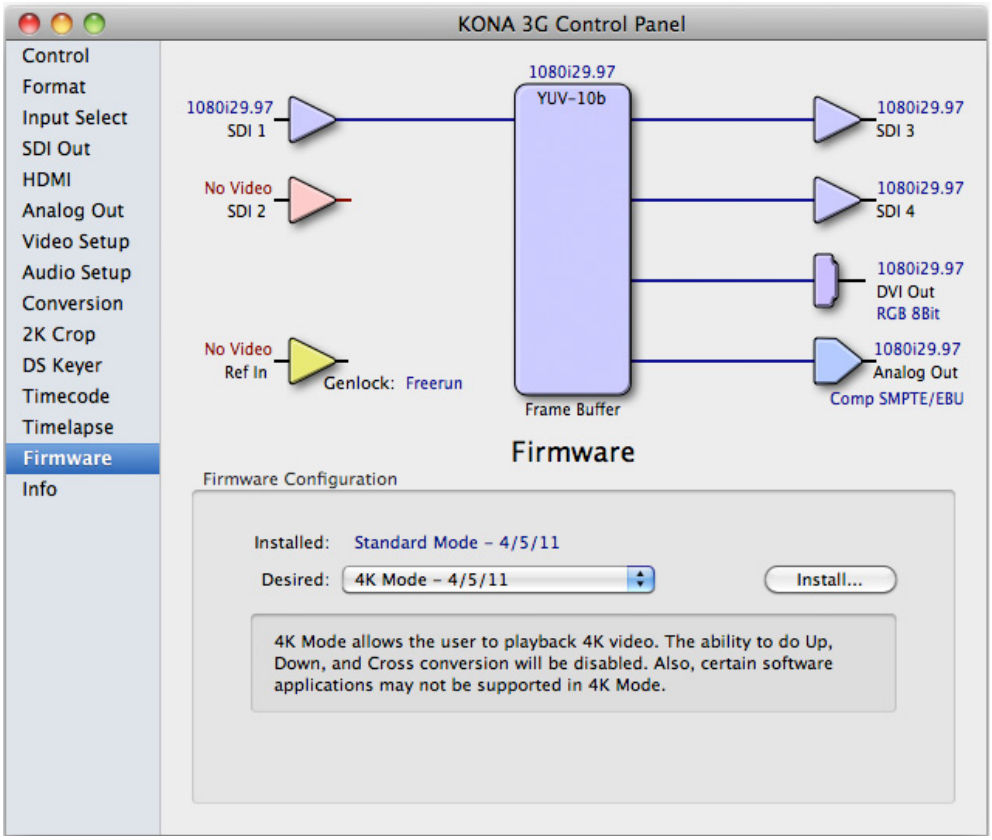
AJA Control Panel, Timelapse Tab

Firmware Tab Screen

Use the KONA 3G tab to access the firmware changeover screen. The Desired pulldown menu allows you to select either:

- Standard Mode—for SD, HD, and 2K formats (allows up/down/crossconversion)
- 4K Mode—for SD, HD, 2K and QuadHD (3840x2160) and 4K (4096x2160) formats (disables up/down/crossconversion)

Click install to erase current firmware and load the desired mode. Note the Installation message shown below.



Firmware Changeover to 4K

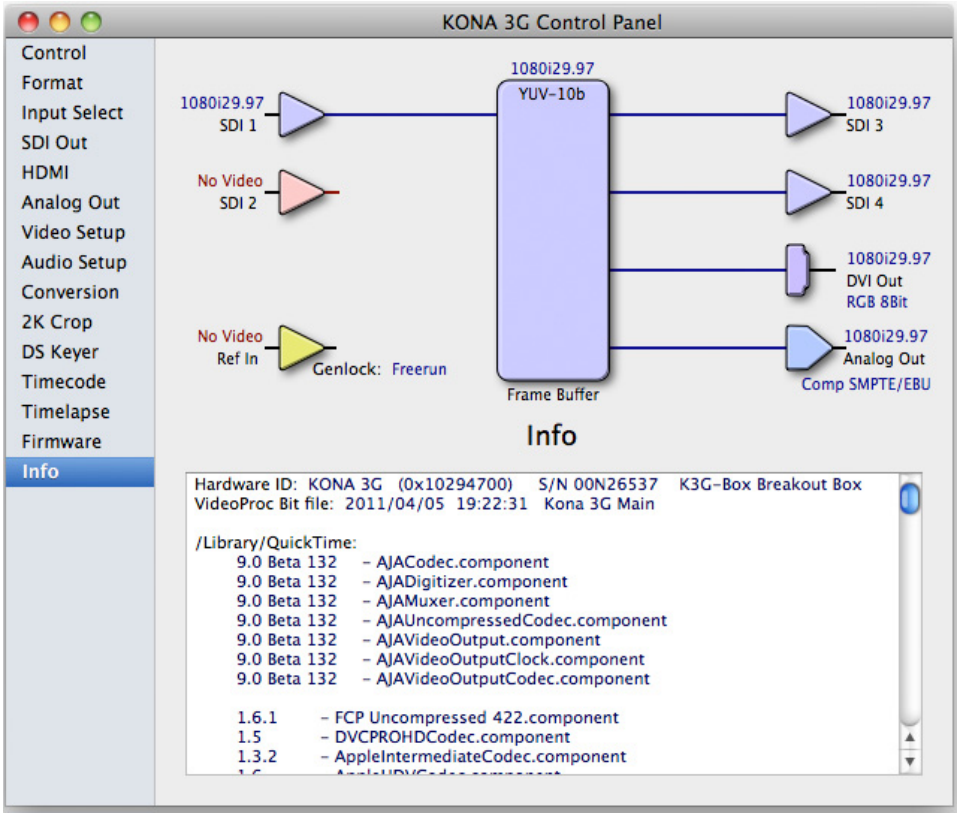
You will be required to power-cycle your computer to finish the changeover.

Firmware
Firmware Configuration
Installed: 4K Mode - 4/6/11
Desired: Standard Mode - 4/5/11
Install...
Standard Mode allows the user to do Up, Down, and Cross conversion. The ability to do 4K video playback will be disabled.
Success - You must power cycle your Mac

Changeover Completed

Info Tab Screen

This Tabbed screen shows the KONA 3G software files that have been installed on your system. This information may be needed if you talk to an AJA Customer Service representative to determine if files are missing or need updating.



Information Screen in Standard Mode

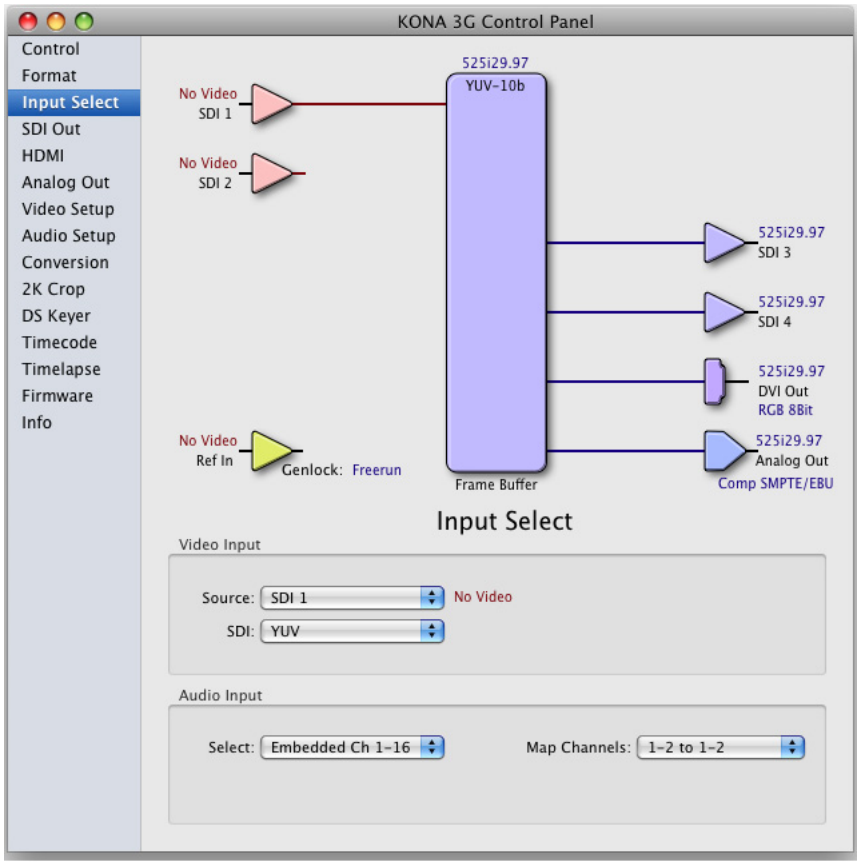
Using 4K Mode

In 4K Mode, you can output four channels of video representing individual quadrants of the higher definition 3840x2160 and 4096x2160 4K formats, see *"Format Tab Screen Settings" on page 58*.

Physical connections of the quadrants will be mapped to the KONA 3G SDI connectors as shown below. For the HDMI and Analog Outputs, you can select just one of the quadrants for viewing (see their respective tabs for quadrant selection).

Mapping of Quad SDI Outputs

This section describes the AJA Control Panel operations specific to 4K Mode. Note that in 4K Mode, you can still capture and playback SD, HD, and 2K formats, though there are no up/down/cross conversions available. You will see SDI inputs only when SD, HD, or 2K inputs are selected. SDI Outputs 1 & 2 will be reconfigured as SDI 1 & 2 Inputs on the screen.

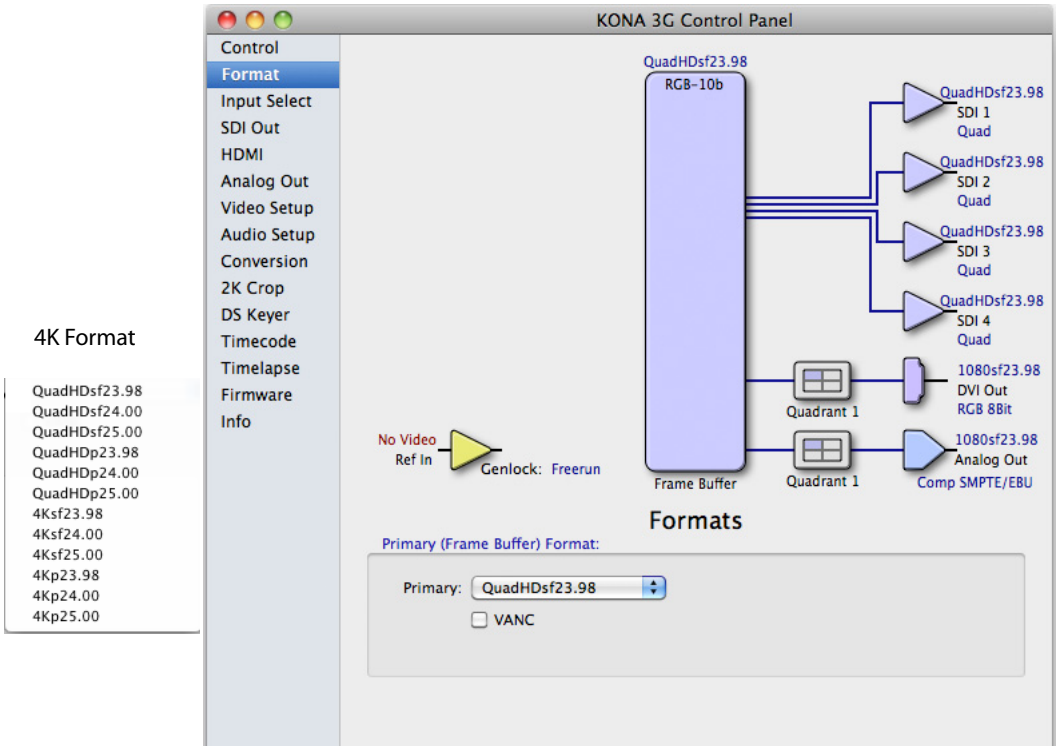


HD SDI Inputs in 4K Mode

Note: Up, Down, and Cross Conversion are available only when the KONA 3G module has Standard Mode firmware installed (see *"Firmware Tab Screen" on page 86*).

Format Tab in 4K Mode

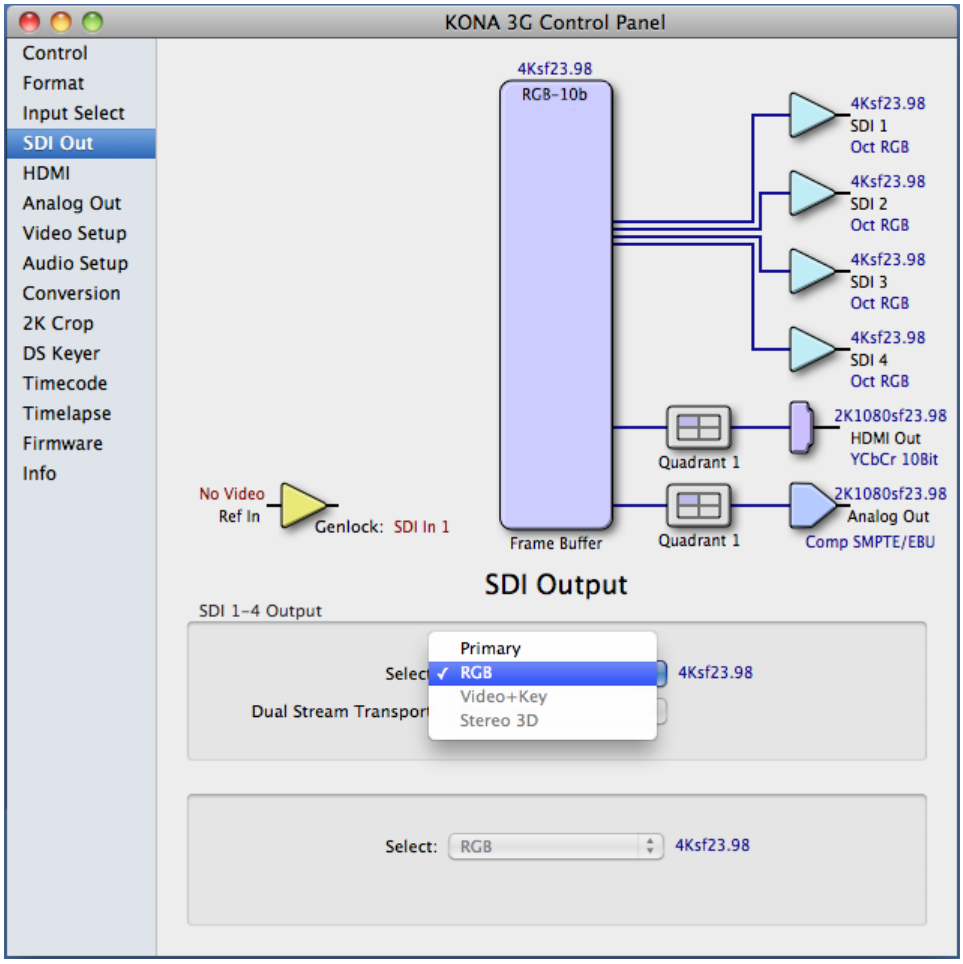
In 4K Mode, you will see SDI inputs only when the selected Primary Format is standard SD, HD or 2K. SDI inputs are reconfigured as Outputs SDI 1 & 2 when a 4K format is selected.



Format Tab Screen with 4K Primary Selected

SDI Output Tab in 4K Mode

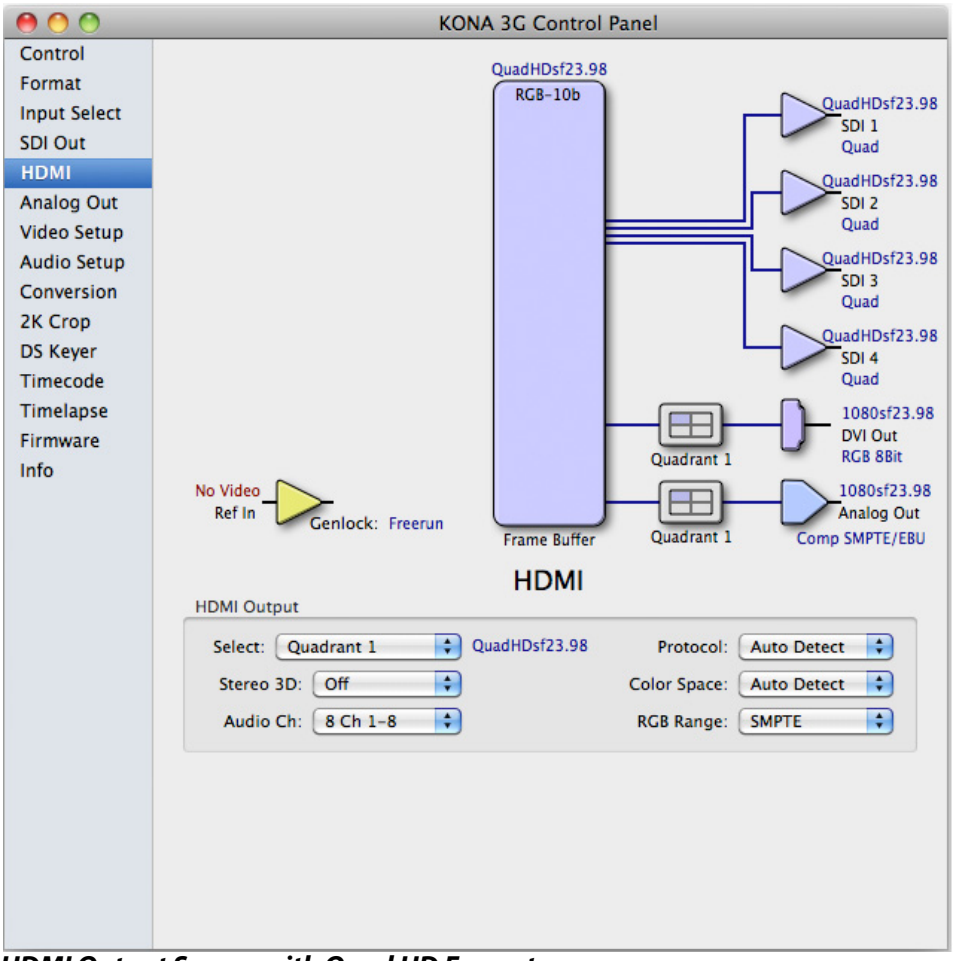
The SDI Output Screen allows you to select the Primary format or RGB for 4K output. Video+Key and Stereo 3D are available selections for SD, HD, or 2K formats only.



SDI Output Screen with 4K Format

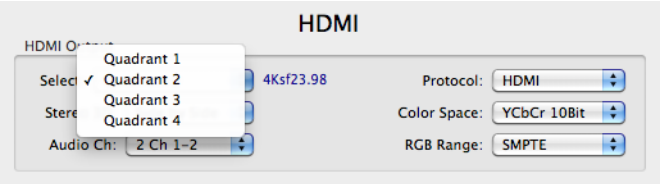
HDMI Tab in 4K Mode

The HDMI screen allows you to make the same selections previously described for Standard Mode when an SD, HD, or 2K format is selected (refer to *"HDMI Output Tab Screen" on page 70*).



HDMI Output Screen with Quad HD Format

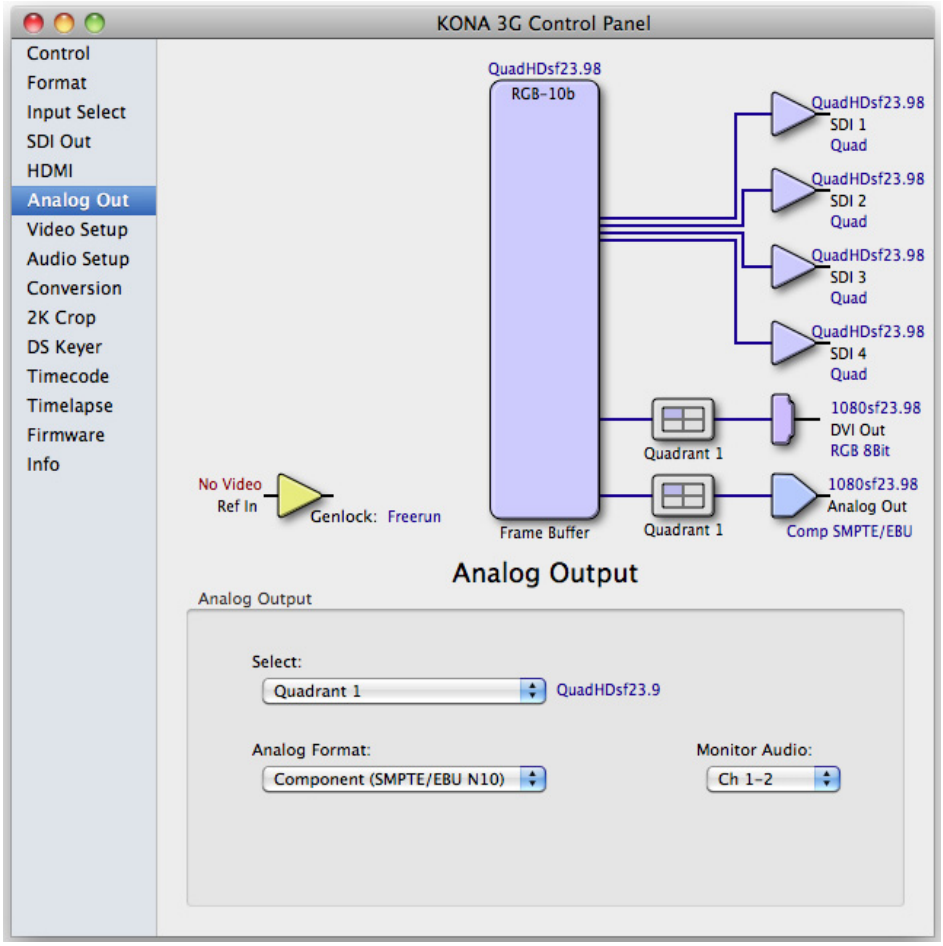
For 4K formats, a Quandrant Select menu is available to choose the desired quarter-segment of the 4K display for HDMI output to a monitor (see the discussion on 4K quadrant mapping at this beginning of this section).



HDMI 4K Quadrant Selection Menu

Analog Output Tab in 4K Mode

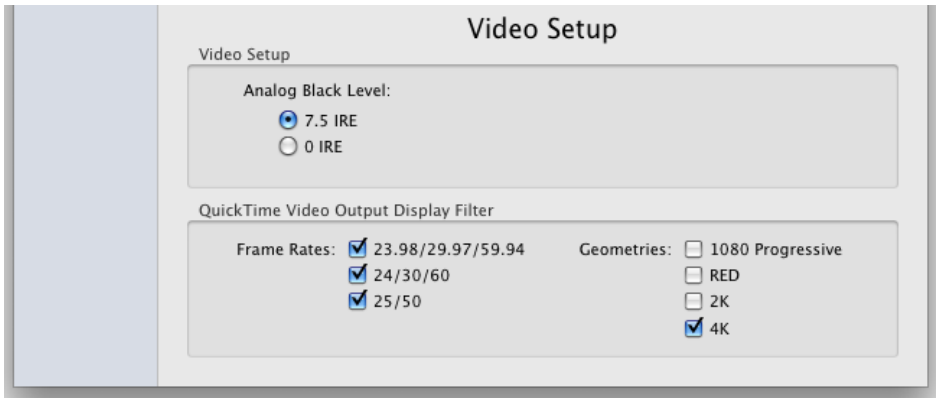
The Analog Output screen allows you to make the same selections previously described for Standard Mode when an SD, HD, or 2K format is selected (refer to *"Analog Out Tab Screen" on page 71*).



Analog Output Screen with Quad HD Format

For 4K formats, a Quandrant Select menu is available to choose the desired quarter-segment of the 4K display for Analog Output to a monitor (see the discussion on 4K quadrant mapping at this beginning of this section). 4K Mode also adds the 4K Geometry selection (check box).

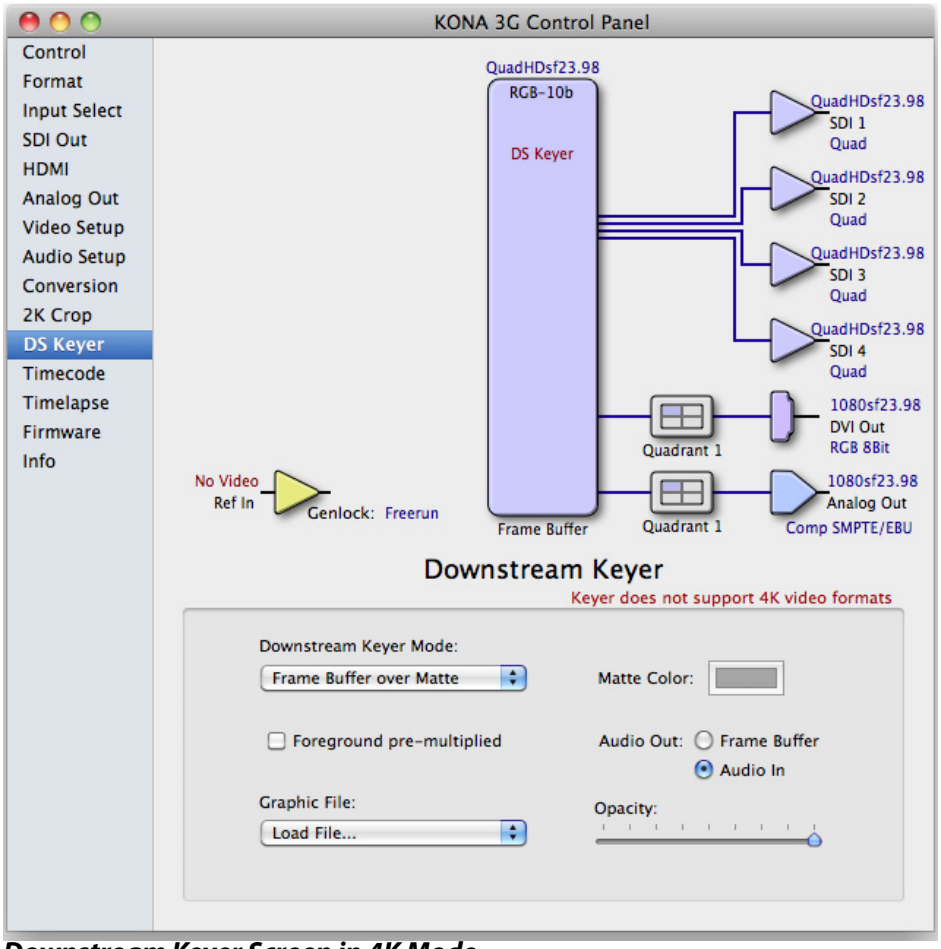
Video Setup Tab in 4K Mode



Video Setup Adding 4K Geometry Checkbox

Downstream Keyer Tab in 4K Mode

The Downstream Keyer is not available for use in 4K Mode. If you select the tab, you will see:



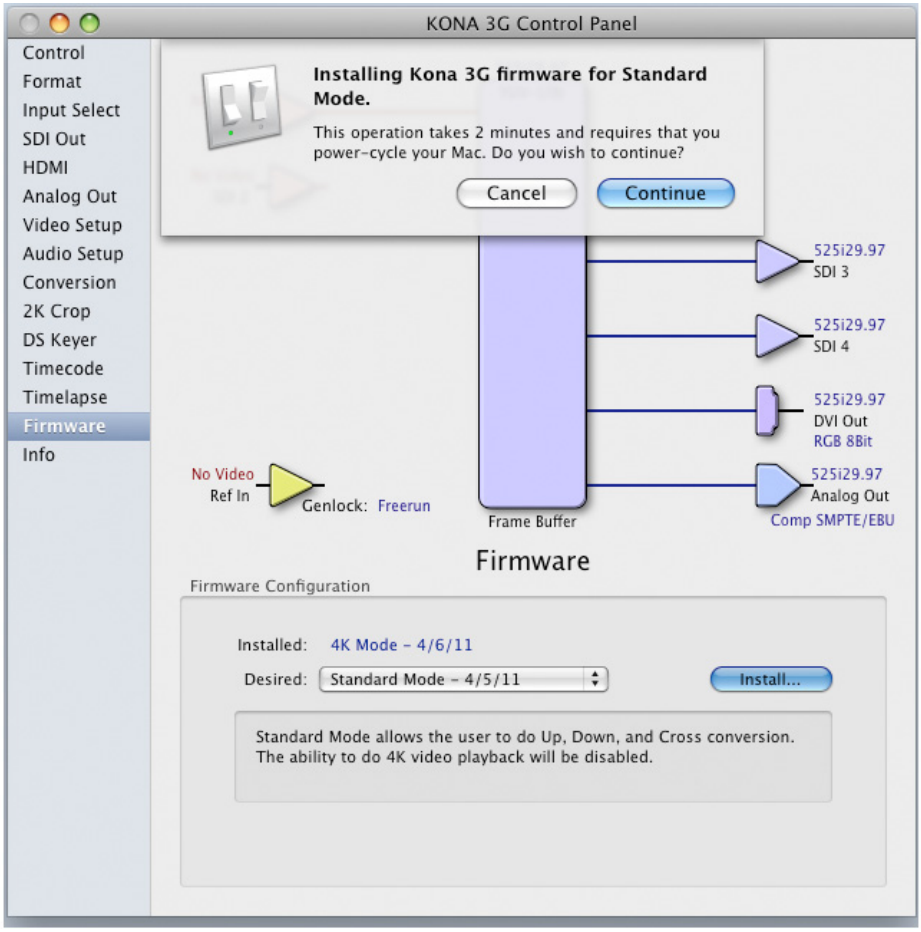
Downstream Keyer Screen in 4K Mode

Firmware Tab for Standard Firmware Update

Use the KONA 3G tab to access the firmware changeover screen. The Desired pulldown menu allows you to select either:

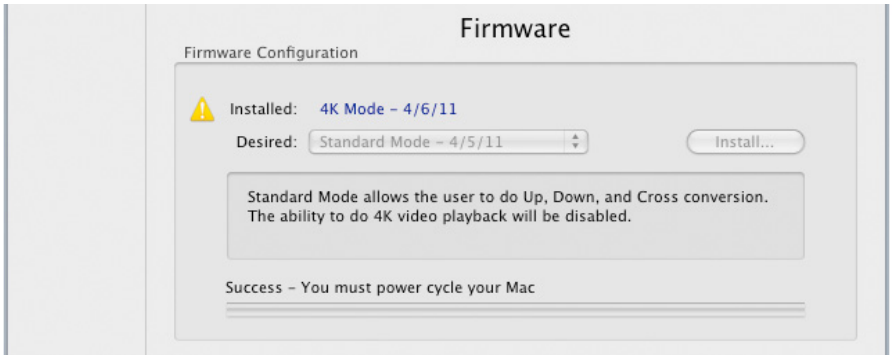
- Standard Mode—for SD, HD, and 2K formats (allows up/down/crossconversion)
- 4K Mode—for SD, HD, 2K and QuadHD (3840x2160) and 4K (4096x2160) formats (disables up/down/crossconversion)

Select Standard Mode and click install to erase 4K firmware and load the Standard Mode. Note the Installation message shown below.



Firmware Changeover to 2K

You will be required to power-cycle your computer to finish the changeover.


Firmware
Firmware Configuration
Installed: 4K Mode - 4/6/11
Desired: Standard Mode - 4/5/11
Install...
Standard Mode allows the user to do Up, Down, and Cross conversion.
The ability to do 4K video playback will be disabled.
Success - You must power cycle your Mac

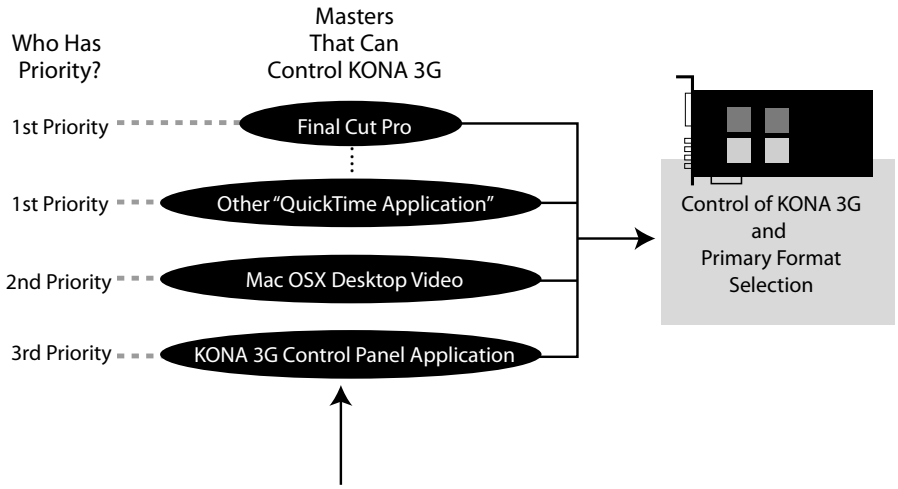
Saving Your Control Panel Presets

After configuring the AJA Control Panel via the Tabbed screens, you can then save all your settings as a snapshot for later recall—called a preset. In this way, you can organize the presets for all your typical tasks, saving time by not having to manually reconfigure each time. To save a preset, simply go to "File -> Save Preset...". Be sure to give the preset a meaningful name. Thereafter the preset will be available under the Control Panel "Presets" menu.

Who is Controlling KONA 3G?

If you are consistent in the workflows and formats you use between applications, you generally won't be surprised by how your system operates. KONA 3G is very flexible and most applications perform the necessary housekeeping so they work correctly when they're active and when they're not. However, since several applications using KONA 3G can be running at once, with one active, it can create confusion when settings are different in each and you switch back and forth. To prevent confusion, we recommend you run the KONA 3G Control Application and have it visible somewhere on your Macintosh desktop. It will tell you, even when it's not the "active" application, who has control of KONA 3G and what the current format selections are.

For further understanding, read on and we'll give you some further background on KONA 3G control. The main issue you'll generally want to know, is what application *has control of KONA 3G's Primary Format at the current moment*.



When you click in an application window, the "Master" controlling KONA 3G changes, possibly changing the Format Selections in effect. This happens because each application has it's own sets of control parameters

TIP: If you keep the KONA 3G Control Panel window in view, it displays the application that is in control and what the Primary and Secondary Format Selections are at all times.

KONA 3G Control Priorities

The AJA Control Panel is one of three masters contending for control—and it's the lowest priority of the three. The other two masters are: any currently running QuickTime application (e.g. Final Cut Pro, KONA TV, Apple Motion, After Effects, etc.) using the board and the Mac "Desktop" display. The priority of these three "masters" is:

1. QuickTime Application
2. Macintosh Desktop
3. AJA Control Panel

"*Master*", means a process that can control and change what the KONA 3G is doing and the Primary and Secondary formats that it uses (as set in the Control Panel "Formats" tab screen).

QuickTime Application—1st Priority

If a running QuickTime application uses KONA 3G for capture or output, it controls the Primary format via its own menus and settings. For example, when Final Cut Pro is active (it's the topmost application) and has KONA 3G as its "A/V Device", then the KONA 3G's Primary format is determined by Final Cut's "Video Playback" submenu (under the "View" menu) or in its "Audio/Video Settings..." dialog under A/V Devices.

When a QuickTime application is in control of the KONA 3G board—versus one of the other masters—it will be indicated by a label in both the KONA Control Panel's *Formats* and *Control* tabs. The AJA Control Panel's *Primary Format* menu will also indicate that it is not active while the QuickTime application is running—it will be grayed-out.

What can be confusing is that QuickTime applications can start and stop and change modes—even while they are running! And the behavior of different QuickTime applications can vary: some applications take control of the board as soon as they are launched and don't give it up until they quit, while other applications take control of the board only when they are the "front-most" running application and then relinquish control when they're not. Final Cut Pro is one of the latter type QuickTime applications. This difference in behavior can surprise you when you click in and out of multiple QuickTime application windows.

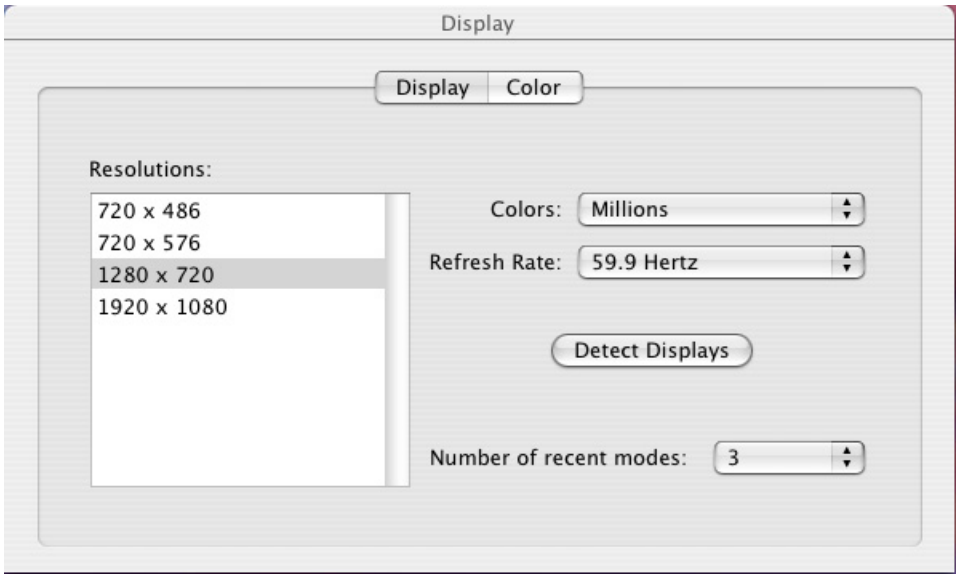
To illustrate such possible confusion, consider this multiple application scenario:

1. Open Final Cut Pro, select KONA 3G as the A/V device. FCP takes control of the board and tells it what Primary format to use. If one of the FCP windows covers up the KONA Control Panel application (which typically happens), you won't be able to see the *"KONA card is in use by Final Cut Pro"* message displayed in the Control Panel, or be able to tell which format FCP has selected. (This is why we recommend you arrange your display so you can see the Control Panel at all times.)
2. Next, you want to see what the KONA card is doing, so you find the KONA Control Panel application by clicking around on the desktop, eventually clicking on the Control Panel to make it visible. As soon as FCP realizes it is now running in the background, it gives up control of the KONA 3G board. The KONA Control Panel application takes away the *"...Final Cut Pro"* message.
3. With the Control Panel the topmost application—and in control of the board—you now switch to a different Primary format.
4. However, when you click back on Final Cut Pro and bring it back to continue your project, it becomes the master again and resets the board's Primary format to the one determined by Final Cut's A/V Settings dialog. To further the surprise, if FCP's windows are covering the KONA Control Panel window, the change will be hidden and you won't know why the board isn't doing what you told it earlier via the Control Panel.

The moral of the story: keep the Control Panel visible so you can learn what various QuickTime applications are doing when they control KONA 3G—and then you can step in and change the application's settings and Control Panel settings as desired to get the configuration you expect.

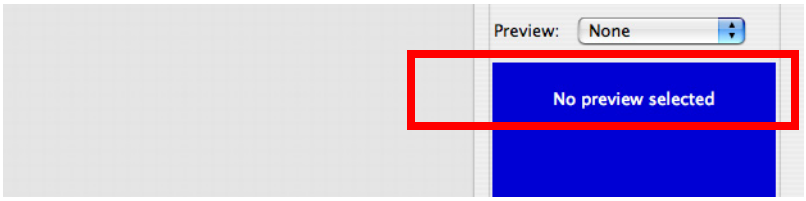
Mac Desktop Video—2nd Priority

If you choose "Macintosh Desktop" as your KONA Default Video Output (in the Control Tab), then the Mac Finder uses the KONA 3G board as a second (or third, or fourth...) graphics "desktop" output—*as long as there isn't a QuickTime application running.* When the Finder is in control, the Primary Format is dictated by the System Preferences "Displays" panel or by you selecting "Show Displays in the menu bar", from the Displays menu near the right-hand side of the main menu bar).



Detect Displays
Turn On Mirroring
Main Display
1280 x 960, 75 Hz, Millions
✓ 1280 x 1024, 60 Hz, Millions
1280 x 1024, 75 Hz, Millions
Display 2
1280 x 960, 75 Hz, Millions
✓ 1280 x 1024, 60 Hz, Millions
1280 x 1024, 75 Hz, Millions
Display 3
720 x 576, 25 Hz, Millions
✓ 1280 x 720, 60 Hz, Millions
1920 x 1080, 30 Hz, Millions
Displays Preferences...

When the Finder is in control of the KONA board, the KONA Control Panel disables the Primary Format popup and puts a message in the KONA Control Panel "Formats" tab as follows:



AJA Control Panel—3rd Priority

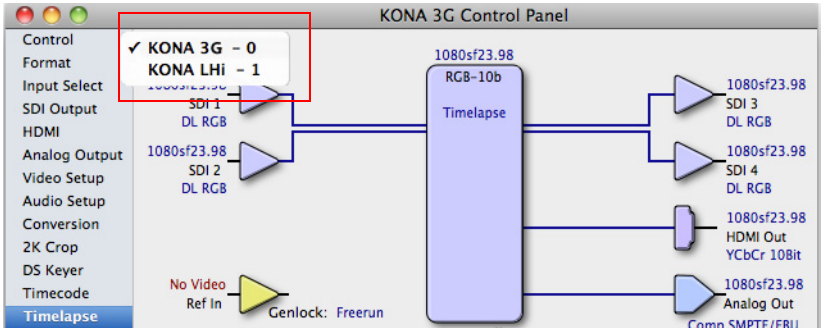
If a QuickTime application *is not running* and the *Default Video Output* is not set to *Mac Desktop,* then the AJA Control Panel gets control of the board.

Control Recommendations

To avoid surprises, run the AJA Control Panel, keep it visible on the desktop—and stay consistent in your settings within the various QuickTime applications while working on a project. For example, if you're working in a particular format (e.g. 525i29.97), it would make sense to set Final Cut Pro for 525i29.97, the Mac Desktop size to 720x486, and the AJA Control Panel for 525i29.97. Then, when you switch between applications, the output will stay in the same format. Having the Control Panel running and visible helps because you can always check and see what the board is doing and who has control of it—even when the Control Panel is running in the background.

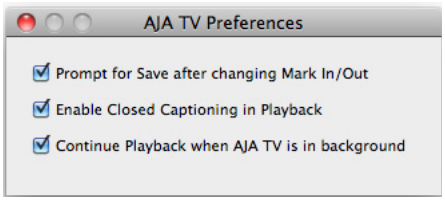
Using Multiple AJA Products

Starting with the v7.5 drivers, more than one AJA product can be used with your host computer. Using the AJA Control Panel application, you can choose which installed product an application uses for input/output. In the upper left corner of the AJA Control Panel application, you will see a board name, such as KONA 3G-0 and the pane heading will read "AJA Control Panel" if you have more than one product and the associated drivers installed (if only one product is installed, you'll see no product or pulldown and the product name will appear in the header). To "target" a specific installed product for use, click on the text in the upper left hand side of the UI and select from the list of available products that appear in the pulldown.



When you launch an application such as Final Cut Pro, or AJA TV, that application will use the product that is currently selected in the AJA Control Panel application for its input/output. Once an application is running, you can change the "targeted" product selection in the AJA Control Panel and select a different product. The running application will retain its connection to the product. If you change the "targeted" product and launch a different application, that application will use the new product for its input/ output, while the first application you launched will continue to use the other AJA product.

Example: select a KONA 3G as the targeted product in the AJA Control Panel application. Launch Final Cut Pro. Final Cut Pro is now using the KONA 3G for its input/output. Go back to the AJA Control Panel application and select a KONA LHi as the "targeted" product. Launch the AJA TV application. AJA TV would now use the LHi for its output. If you switch back to Final Cut Pro, you would note that it is still uses the KONA 3G for its input/output. Note that some applications, like AJA TV, have a provision for playing in the background, so playback on one product could even continue when switching the targeted device for use with another application. You can even feed the output from one AJA product to another AJA product on the same system in such cases.


AJA TV Preferences
Prompt for Save after changing Mark In/Out
Enable Closed Captioning in Playback
Continue Playback when AJA TV is in background

AJA TV Preferences, Continue Playback when AJA TV is in background

AJA TV optionally supports playback in the background; checkbox "Continue Playback when AJA TV is in background.

Notes on using multiple AJA Products:

Performance of multi-product use depends on a variety of factors: CPU usage, RAM, disk IOPS/bandwidth for streams of video, etc. and therefore performance may vary. Also be aware that multiple input/output streams are only supported by software that is explicitly designed for a multi-product environment.

Easy Setups for Typical Uses

Final Cut and KONA 3G together make working with multiple formats an easy proposition. Inside of Final Cut, equipment and setting presets are available in groups called Easy Setups, from which you can choose typical system configurations. A large set of Easy Setups are supplied with KONA 3G and installed along with the KONA 3G software. These canned choices can be used directly or as the basis for making your own customized Easy Setups unique to your system. By duplicating an Easy Setup and then making changes to it, you simplify the process of configuring and re-configuring when working with new formats.

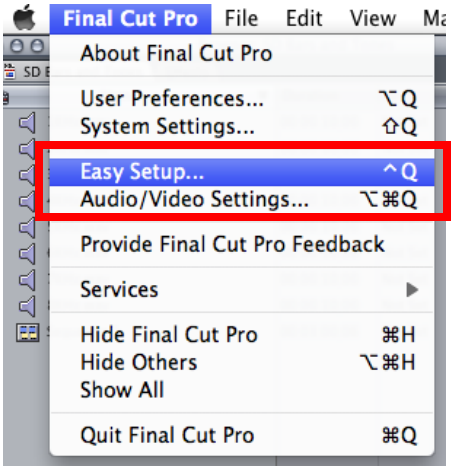
Although this manual assumes you're familiar with Final Cut Pro and have read its documentation, let's review Easy Setups and how to use them effectively with KONA 3G.

At the simplest level, Final Cut lets you choose and edit presets for capturing media, device control, and for project sequences. These presets are defined in the *Audio/Video Settings* menu. Just like Easy Setups, here also there are factory defined choices, plus you can create and make your own. When you have a set of presets you want to use again, you can store them as an "Easy Setup."

On the following pages we'll further review the *Easy Setups* menu and *Audio/Video Settings* Menu.

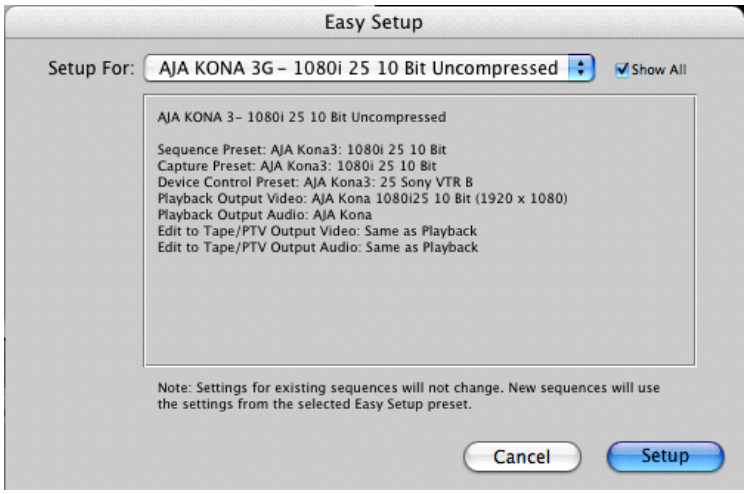
Easy Setups Menu

Both the Easy Setups menu item and the Audio/Video Settings menu item are located under the main *Final Cut Pro* menu.



Easy Setup and Audio/Video Menu Items

Click on the Easy Setups menu item and Final Cut Pro will present the Easy Setup dialog window:


Easy Setup
Setup For:
AJA KONA 3G – 1080i 25 10 Bit Uncompressed
Show All
AJA KONA 3– 1080i 25 10 Bit Uncompressed
Sequence Preset: AJA Kona3: 1080i 25 10 Bit
Capture Preset: AJA Kona3: 1080i 25 10 Bit
Device Control Preset: AJA Kona3: 25 Sony VTR B
Playback Output Video: AJA Kona 1080i25 10 Bit (1920 x 1080)
Playback Output Audio: AJA Kona
Edit to Tape/PTV Output Video: Same as Playback
Edit to Tape/PTV Output Audio: Same as Playback
Note: Settings for existing sequences will not change. New sequences will use the settings from the selected Easy Setup preset.
Cancel
Setup

Easy Setup Dialog

At the top of the Easy Setup dialog is the currently selected Easy Setup. It can be changed by clicking on the pulldown arrow at the right. Doing so results in a long list of the factory Easy Setups stored on the system. If you wish to see all of the Easy Setups, factory and user-defined, then ensure the "Show All" checkbox is marked at the right side of the dialog. By default, all AJA Easy Setups will be checked.

A large set of Easy Setups are Provided as KONA 3G defaults
(partial list shown)
AJA KONA 3G– 1080p 25 Apple ProRes 422 (LT)
AJA KONA 3G– 1080p 25 Apple ProRes 422 (Proxy)
AJA KONA 3G– 1080p 25 Apple ProRes 4444
AJA KONA 3G– 1080p 25 DVCPro HD
AJA KONA 3G– 1080p 29.97 10 Bit Uncompressed
AJA KONA 3G– 1080p 29.97 8 Bit Uncompressed
AJA KONA 3G– 1080p 29.97 Apple ProRes 422
AJA KONA 3G– 1080p 29.97 Apple ProRes 422 (HQ)
AJA KONA 3G– 1080p 29.97 Apple ProRes 422 (LT)
AJA KONA 3G– 1080p 29.97 Apple ProRes 422 (Proxy)
AJA KONA 3G– 1080p 29.97 Apple ProRes 4444
AJA KONA 3G– 1080p 29.97 DVCPro HD
AJA KONA 3G– 1080p 30 10 Bit Uncompressed
AJA KONA 3G– 1080p 30 8 Bit Uncompressed
AJA KONA 3G– 1080p 30 Apple ProRes 422
AJA KONA 3G– 1080p 30 Apple ProRes 422 (HQ)
AJA KONA 3G– 1080p 30 Apple ProRes 422 (LT)
AJA KONA 3G– 1080p 30 Apple ProRes 422 (Proxy)
AJA KONA 3G– 1080p 30 Apple ProRes 4444
AJA KONA 3G– 1080p 30 DVCPro HD
AJA KONA 3G– 1080p 50a 10 Bit Uncompressed
AJA KONA 3G– 1080p 50a 8 Bit Uncompressed
AJA KONA 3G– 1080p 50a Apple ProRes 422
AJA KONA 3G– 1080p 50a Apple ProRes 422 (HQ)
AJA KONA 3G– 1080p 50a Apple ProRes 422 (LT)
AJA KONA 3G– 1080p 50a Apple ProRes 422 (Proxy)
AJA KONA 3G– 1080p 50b 10 Bit Uncompressed
AJA KONA 3G– 1080p 50b 8 Bit Uncompressed
AJA KONA 3G– 1080p 50b Apple ProRes 422
AJA KONA 3G– 1080p 50b Apple ProRes 422 (HQ)
AJA KONA 3G– 1080p 50b Apple ProRes 422 (LT)
AJA KONA 3G– 1080p 50b Apple ProRes 422 (Proxy)
AJA KONA 3G– 1080p 59.94a 10 Bit Uncompressed
AJA KONA 3G– 1080p 59.94a 8 Bit Uncompressed
AJA KONA 3G– 1080p 59.94a Apple ProRes 422
AJA KONA 3G– 1080p 59.94a Apple ProRes 422 (HQ)
AJA KONA 3G– 1080p 59.94a Apple ProRes 422 (LT)
AJA KONA 3G– 1080p 59.94a Apple ProRes 422 (Proxy)
AJA KONA 3G– 1080p 59.94b 10 Bit Uncompressed
AJA KONA 3G– 1080p 59.94b 8 Bit Uncompressed
AJA KONA 3G– 1080p 59.94b Apple ProRes 422

Factory Easy Setups

To choose a new Easy Setup from the list, click on the pulldown menu and select a desired choice. The choice won't take effect until you click the *Setup* button, but you will be able to see the description for the choice just by selecting it (without clicking the *Setup* button). Descriptions provide a paragraph summarizing what the Easy Setup is intended for and then each of the presets are explained (Sequence, Capture, Device, Playback Output, and Edit to Tape Video/Audio Outputs).

Easy Setups For Use With KONA 3G

The factory default Easy Setups currently shipped with KONA 3G are updated regularly by AJA and posted on the relevant support web page for your model of KONA (*http://www.aja.com*). In addition to this, there are additional easy setups available on your KONA Software CD

Audio/Video Settings Menu

The Audio/Video Settings menu in Final Cut Pro contains a series of tabbed windows where you define the presets in specific categories such as A/V devices or in what format media is captured. When you open the Audio/Video Settings window, it shows a summary of the currently selected Easy Setup. Other tabbed windows are available with greater details about each category. On the initial summary window you can see the selected presets for the Easy Setup as well as change specific presets.

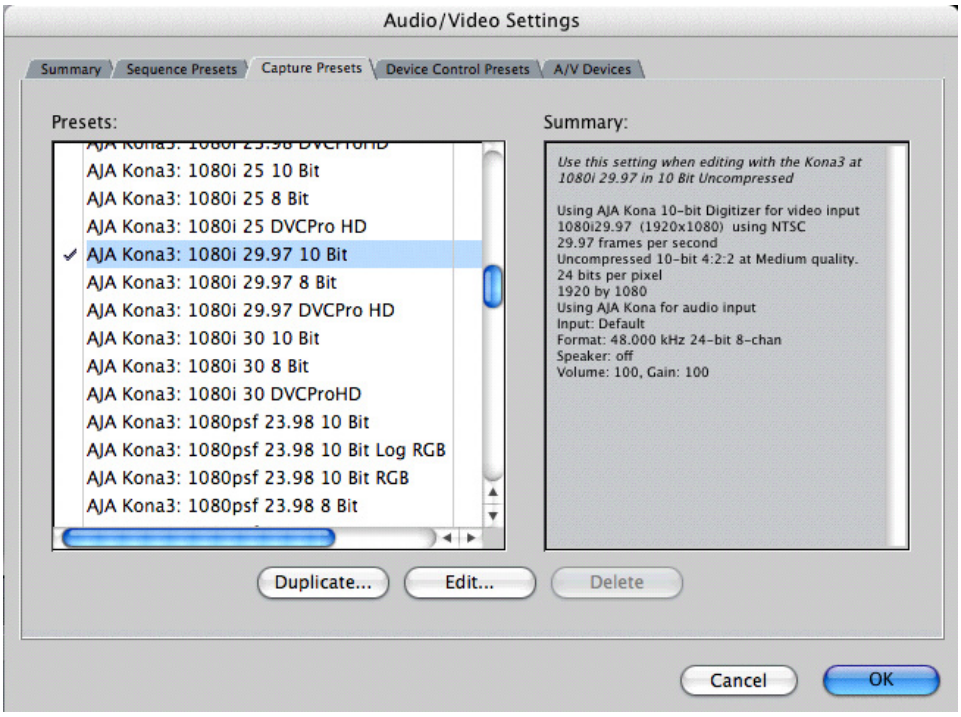
The presets you can change on the Summary window are:

Sequence Preset—select one of these as the editing timebase for new sequences. If you make a change to Sequence Presets, the change will only take effect on any new sequences you create—currently active sequences will not see the change.

Capture Preset—select one of these to set the incoming source format you'll be capturing. Ideally select the maximum quality format you'll be using for most of the material so there will be no need to re-render later as clips are added from the bin to the sequence.

Device Control Preset—select the AJA Video KONA 3G device (NTSC or PAL as desired). This tells Final Cut that the KONA 3G will control the VTR attached to KONA 3G.

A/V Devices (Audio and Video Playback)—select the KONA 3G as video and audio playback devices for Final Cut and the format to be output.

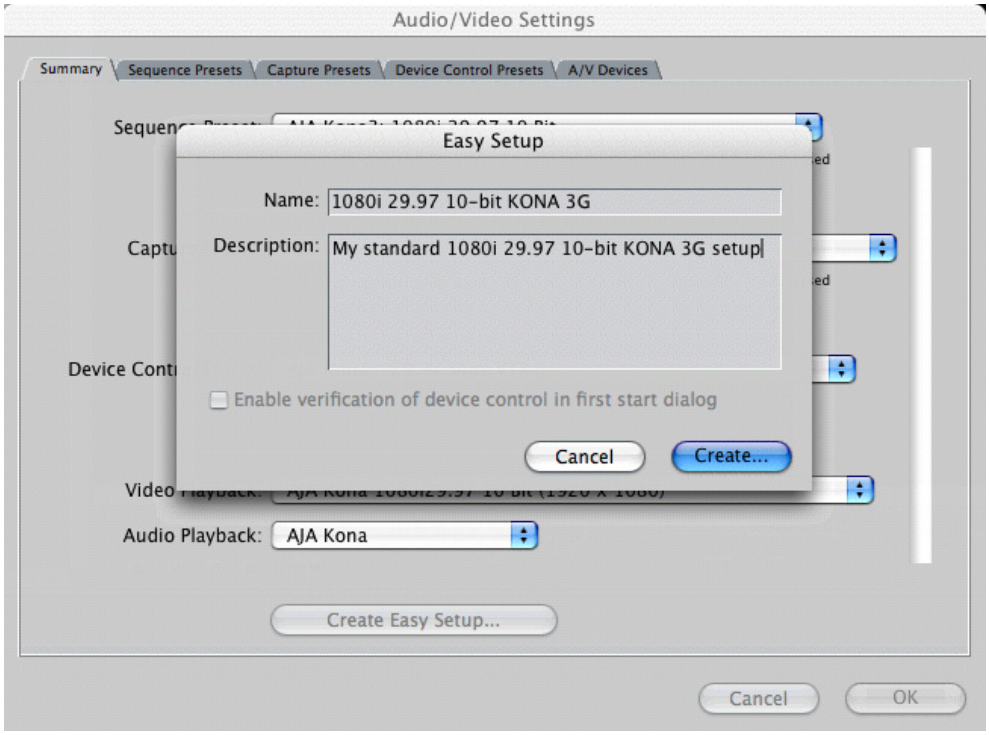

Audio/Video Settings
Summary
Sequence Presets
Capture Presets
Device Control Presets
A/V Devices
Presets:
AJA Kona3: 1080i 25 10 Bit
AJA Kona3: 1080i 25 8 Bit
AJA Kona3: 1080i 25 DVCPro HD
AJA Kona3: 1080i 29.97 10 Bit
AJA Kona3: 1080i 29.97 8 Bit
AJA Kona3: 1080i 29.97 DVCPro HD
AJA Kona3: 1080i 30 10 Bit
AJA Kona3: 1080i 30 8 Bit
AJA Kona3: 1080i 30 DVCProHD
AJA Kona3: 1080psf 23.98 10 Bit
AJA Kona3: 1080psf 23.98 10 Bit Log RGB
AJA Kona3: 1080psf 23.98 10 Bit RGB
AJA Kona3: 1080psf 23.98 8 Bit
Summary:
Use this setting when editing with the Kona3 at 1080i 29.97 in 10 Bit Uncompressed
Using AJA Kona 10-bit Digitizer for video input
1080i29.97 (1920x1080) using NTSC
29.97 frames per second
Uncompressed 10-bit 4:2:2 at Medium quality.
24 bits per pixel
1920 by 1080
Using AJA Kona for audio input
Input: Default
Format: 48.000 kHz 24-bit 8-chan
Speaker: off
Volume: 100, Gain: 100
Duplicate...
Edit...
Delete
Cancel
OK

Audio/Video Settings, Summary Window

To Create A New Easy Setup

If you have a group of presets that you'd like to use continually, then you can create a new Easy Setup by modifying the settings of Easy Setup currently selected (pick one most like the one you want to create) and then saving it under a new name:

1. Change the currently selected Easy Setup by making changes at the Summary tabbed window via the pulldown menus.
2. When everything is set as desired, click on the *Create Easy Setup* button at the bottom of the Summary window.
3. A new dialog will pop up. Enter a descriptive name for the new Easy Setup (i.e., 10-bit SDI from Video Server) in the *Name* field.
4. Enter a sentence or two describing what is unique about the Easy Setup in the *Description* field.
5. Click the *Create* button to store the new Easy Setup.

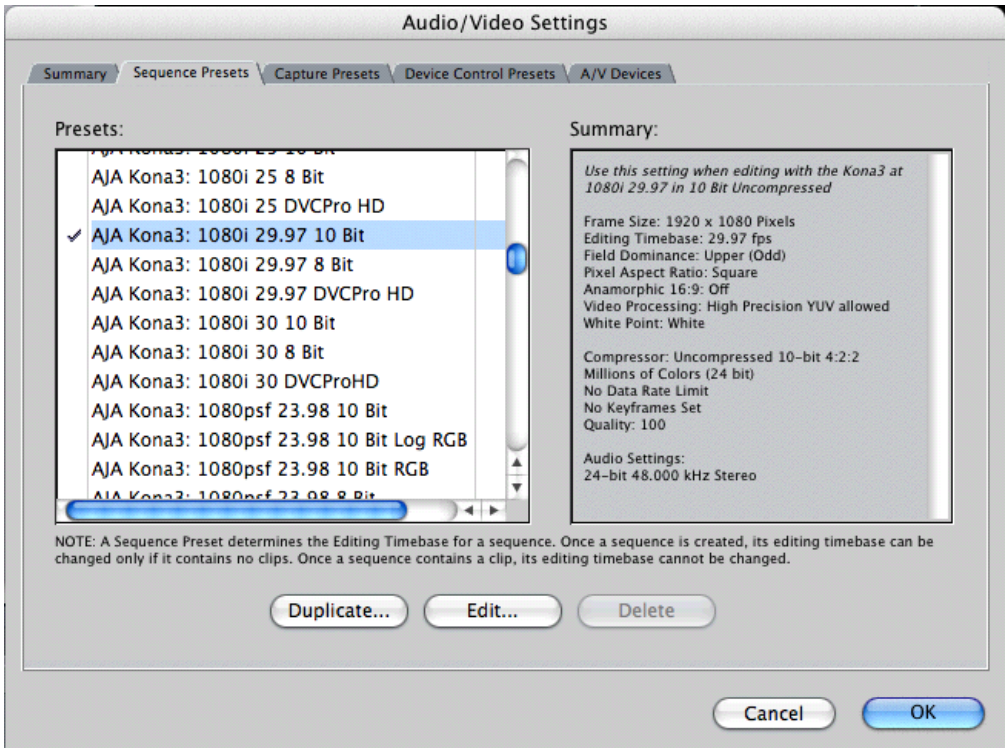


Audio/Video Settings, Creating a New Easy Setup

At any point in the above procedure you can go to the other tabbed windows and make additional changes. For example, in the Sequence Presets, Capture Presets, and Device Control Presets windows you can select a preset and click on an *Edit* button to change specific aspects of the preset. As an example, under *Device Control Preset* you might wish to change the Time Source on your VTR from LTC to VITC, or change the pre-roll and post-roll values. When you save a Setup, it defaults to saving in the Final Cut Pro *Custom Setups* folder.

Each of the tabbed preset screens are described on the following pages for your convenience. For more information, please read the Final Cut Pro user documentation.

The Sequence Presets Window


Audio/Video Settings
Summary
Sequence Presets
Capture Presets
Device Control Presets
A/V Devices
Presets:
AJA Kona3: 1080i 25 8 Bit
AJA Kona3: 1080i 25 DVCPro HD
AJA Kona3: 1080i 29.97 10 Bit
AJA Kona3: 1080i 29.97 8 Bit
AJA Kona3: 1080i 29.97 DVCPro HD
AJA Kona3: 1080i 30 10 Bit
AJA Kona3: 1080i 30 8 Bit
AJA Kona3: 1080i 30 DVCProHD
AJA Kona3: 1080psf 23.98 10 Bit
AJA Kona3: 1080psf 23.98 10 Bit Log RGB
AJA Kona3: 1080psf 23.98 10 Bit RGB
Summary:
Use this setting when editing with the Kona3 at 1080i 29.97 in 10 Bit Uncompressed
Frame Size: 1920 x 1080 Pixels
Editing Timebase: 29.97 fps
Field Dominance: Upper (Odd)
Pixel Aspect Ratio: Square
Anamorphic 16:9: Off
Video Processing: High Precision YUV allowed
White Point: White
Compressor: Uncompressed 10-bit 4:2:2
Millions of Colors (24 bit)
No Data Rate Limit
No Keyframes Set
Quality: 100
Audio Settings:
24-bit 48.000 kHz Stereo
NOTE: A Sequence Preset determines the Editing Timebase for a sequence. Once a sequence is created, its editing timebase can be changed only if it contains no clips. Once a sequence contains a clip, its editing timebase cannot be changed.
Duplicate...
Edit...
Delete
Cancel
OK

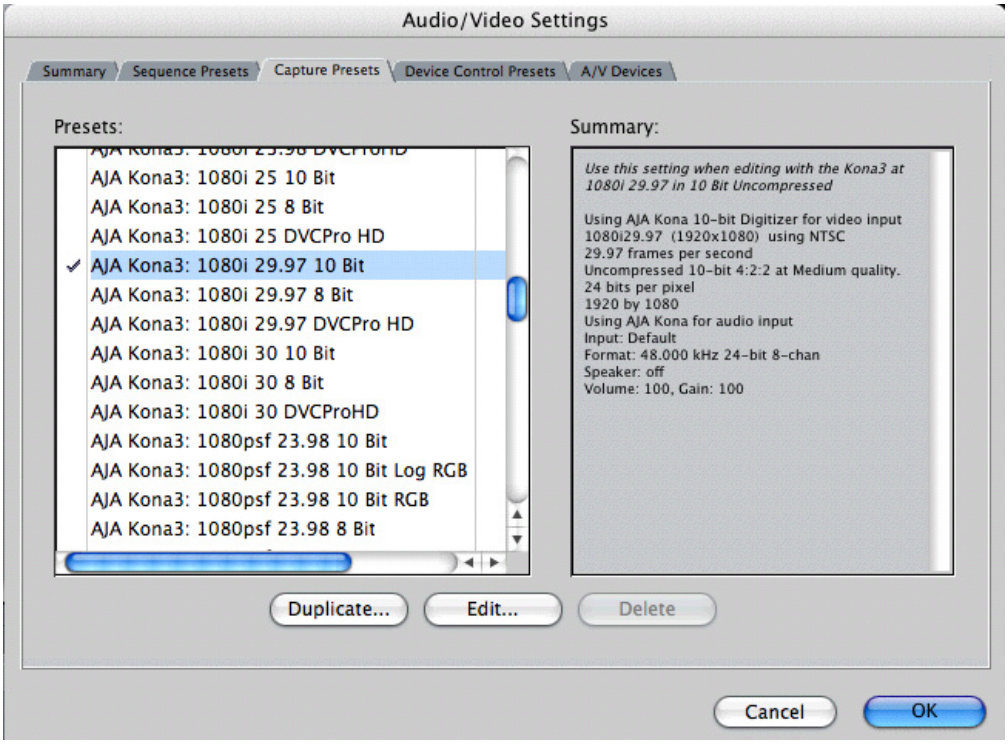
Audio/Video Settings, Sequence Presets Window

This window allows you to select an editing timebase for the current sequence. Once you add a clip to the sequence this cannot be changed. For example, once you've selected uncompressed 10-bit NTSC 48 kHz, you then have to stay in that timebase and can't switch to another. By clicking in the leftmost column (see the checkmark in the sample screen above), you select a new Sequence Preset for use. The checkmark tells which Preset is in use—highlighting a choice alone does not select it.

If you select an editing timebase you can then edit it (click the Edit button) or copy and rename it as another (click Duplicate). When editing a timebase you can change the following:

- Select video processing properties (how to render)
- Frame size and aspect ratio
- Pixel aspect ratio
- Field dominance (none, upper, or lower)
- Editing timebase
- Set QuickTime video codec settings (quality and type)
- Select audio sample rate

The Capture Presets Window


Audio/Video Settings
Summary
Sequence Presets
Capture Presets
Device Control Presets
A/V Devices
Presets:
AJA Kona3: 1080i 25 10 Bit
AJA Kona3: 1080i 25 8 Bit
AJA Kona3: 1080i 25 DVCPro HD
AJA Kona3: 1080i 29.97 10 Bit
AJA Kona3: 1080i 29.97 8 Bit
AJA Kona3: 1080i 29.97 DVCPro HD
AJA Kona3: 1080i 30 10 Bit
AJA Kona3: 1080i 30 8 Bit
AJA Kona3: 1080i 30 DVCProHD
AJA Kona3: 1080psf 23.98 10 Bit
AJA Kona3: 1080psf 23.98 10 Bit Log RGB
AJA Kona3: 1080psf 23.98 10 Bit RGB
AJA Kona3: 1080psf 23.98 8 Bit
Summary:
Use this setting when editing with the Kona3 at 1080i 29.97 in 10 Bit Uncompressed
Using AJA Kona 10-bit Digitizer for video input
1080i29.97 (1920x1080) using NTSC
29.97 frames per second
Uncompressed 10-bit 4:2:2 at Medium quality.
24 bits per pixel
1920 by 1080
Using AJA Kona for audio input
Input: Default
Format: 48.000 kHz 24-bit 8-chan
Speaker: off
Volume: 100, Gain: 100
Duplicate...
Edit...
Delete
Cancel
OK

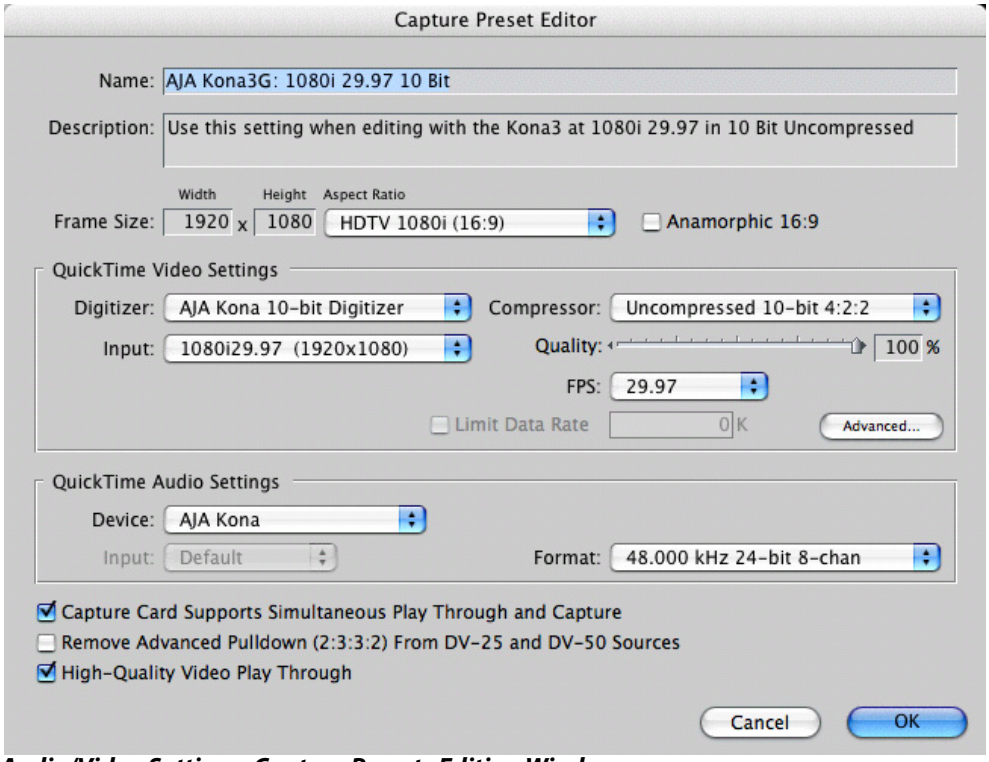
Audio/Video Settings, Capture Presets Window

This window lets you choose a preset format for incoming source video and audio media you'll be capturing. Select the maximum quality format you'll be using for most of the material so there will be no need to re-render later. The information on the right window pane describes the preset and all it's parameters. If you select a format by making a checkmark in the left column, you can edit it (click the Edit button) or copy and rename it as another (click Duplicate). The only exceptions to this are those presets marked with a lock icon; those can be duplicated, but when you try to edit one the system reports they're locked and can only be copied (it will create the copy for you when you try to edit).

Factory AJA presets are easily identified by "AJA" at the beginning of their name.

Since Capture Presets will be used frequently as you bring media into KONA 3G, we'll discuss the edit screen next.

Capture Presets Editing


Capture Preset Editor
Name: AJA Kona3G: 1080i 29.97 10 Bit
Description: Use this setting when editing with the Kona3 at 1080i 29.97 in 10 Bit Uncompressed
Width
Height
Aspect Ratio
Frame Size: 1920 x 1080 HDTV 1080i (16:9)
Anamorphic 16:9
QuickTime Video Settings
Digitizer: AJA Kona 10-bit Digitizer
Compressor: Uncompressed 10-bit 4:2:2
Input: 1080i29.97 (1920x1080)
Quality: 100 %
FPS: 29.97
Limit Data Rate 0 K
Advanced...
QuickTime Audio Settings
Device: AJA Kona
Input: Default
Format: 48.000 kHz 24-bit 8-chan
Capture Card Supports Simultaneous Play Through and Capture
Remove Advanced Pulldown (2:3:3:2) From DV-25 and DV-50 Sources
High-Quality Video Play Through
Cancel
OK

Audio/Video Settings, Capture Presets Editing Window

Note: Whenever a Preset is being copied as the basis of a new preset, always change the name and description to fit the new preset so users aren't confused between it and the original.

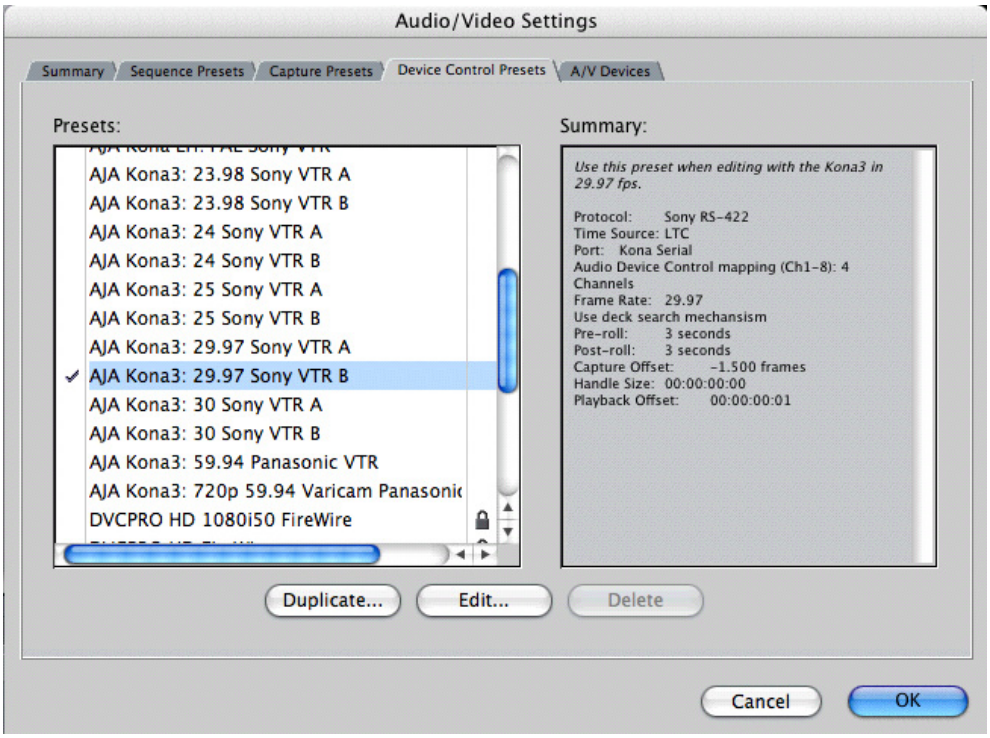
Frame Size—below the name and description are the frame size settings. These can be changed via the pulldown menu. Selecting a new *Aspect Ratio* value also changes the values in the width and height fields.

QuickTime Video Settings—these settings select a video input source and affect how it's processed by Final Cut Pro. The Digitizer pull-down menu selects whether you want the selected input source to be digitized as 8-bit or 10-bit uncompressed video as it comes into KONA 3G. The Input pull-down selects the primary format KONA 3G will use to capture input video. The Compressor pull-down selects a codec that tells Final Cut how to process the video; the codec selected should be chosen for compatibility with the Digitizer setting selected. For example, if your Digitizer setting is 10-bit Uncompressed, then the Compressor setting should be one of the 10-bit choices available. The Quality slider should be set to 100 percent when capturing uncompressed; for other formats use an appropriate quality level. Set the FPS (Frames Per Second) setting to the correct frame rate. The Advanced settings button opens a new screen providing choices of codec-specific options. For uncompressed codecs these probably are not unneeded; for other codecs choose the options desired.

QuickTime Audio Settings—these settings select an audio input source and affect how it's processed by Final Cut Pro. The Device pull-down should be set to KONA 3G. The Input pull-down selects that KONA 3G will be used for capturing audio-it does not select the specific inputs. For specific audio input selection use the AJA Control Panel. The Rate pull-down selects a sample rate; it should always be set to 48 kHz for KONA 3G. By clicking on the Advanced button, a new screen will be displayed where you can select between 8- and 16-bit sampling-AJA recommends 16-bit for optimum sound quality.

(This has nothing to do with input format, as KONA 3G supports 24-bit embedded HD audio, 20-bit SD embedded audio, and 24-bit AES audio.)

The Device Control Presets Window



Audio/Video Settings, Device Control Presets Window

This window selects machine control parameters for an attached VTR. Your choice here tells Final Cut that KONA 3G is handling the machine control parameters for the VTR attached to KONA 3G. Alternatively, you could also select a different device for input/output instead of KONA 3G; for example, if you have a IEEE 1394 camcorder attached to the Power Mac's FireWire port you might choose "FireWire NTSC." The information on the right window pane describes the current machine control settings and parameters for the VTR attached. For KONA 3G presets this means the VTR attached at the RS422 port on KONA 3G. For non-KONA 3G presets, this means camcorder/VTRs attached directly at the FireWire port or via some other interface.

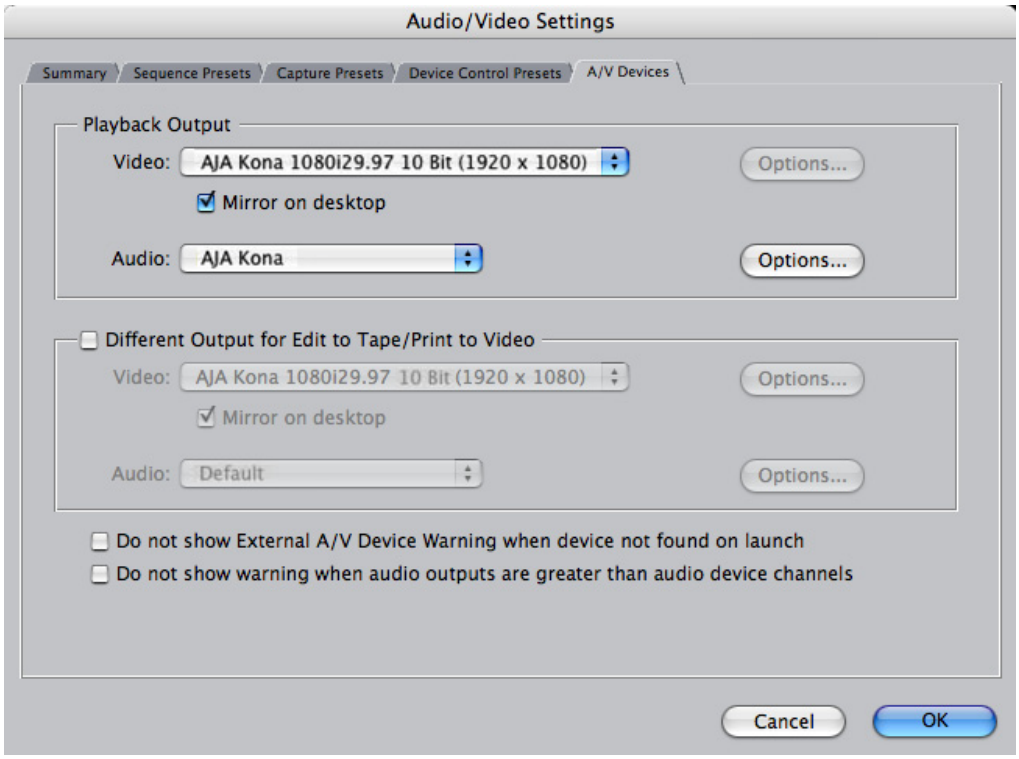
If you select a preset you can edit it (click the Edit button) or copy and rename it as another (click Duplicate). The only exceptions to this are those presets marked with a lock icon; those can be duplicated, but when you try to edit one the system reports they're locked and can only be copied (it will create the copy for you when you try to edit).

When editing a Device Control preset you can change the following:

- Name and description of Device Control preset
- Protocol for capture/playback VTR (for KONA 3G this will be RS422)
- Audio Mapping
- Time Source (LTC/VITC/both/etc.)
- Port
- Frame Rate
- Default Timecode (Drop Frame etc.)
- Capture/Playback Offsets (to correct for VTR versus Final Cut timing issues)
- Handles/Pre-roll/Post-roll
- Auto Record and PTV

KONA 3G ships with VTR Device Control Presets for Sony and Panasonic VTRs. Select a Device Control Preset for the desired frame rate. Presets for both Sony and Panasonic VTRs are provided with these frame rates: 23.98, 24, 25, 29.97, and 59.94.

The A/V Devices Window



Audio/Video Settings, A/V Devices Window

The A/V Devices window selects the current playback device for both audio and video. Typically, you'll select KONA 3G for both playback devices. The format chosen determines the Primary format for the KONA 3G board during playback.

The Video *Options* button is greyed out for KONA 3G (use the AJA Control Panel for video configuration; the Audio *Options* button opens a second dialog where Final Cut gives options for changing bit depth, number of channels, and the sample rate. Since Final Cut currently only supports 2 channels of audio, AJA recommends you leave all of these settings as set in the factory defaults.

You may wish to use a different KONA 3G output for final Print-to-tape from Final Cut. You can select that in this window by clicking the checkbox "Different Output for Edit to Tape/Print to

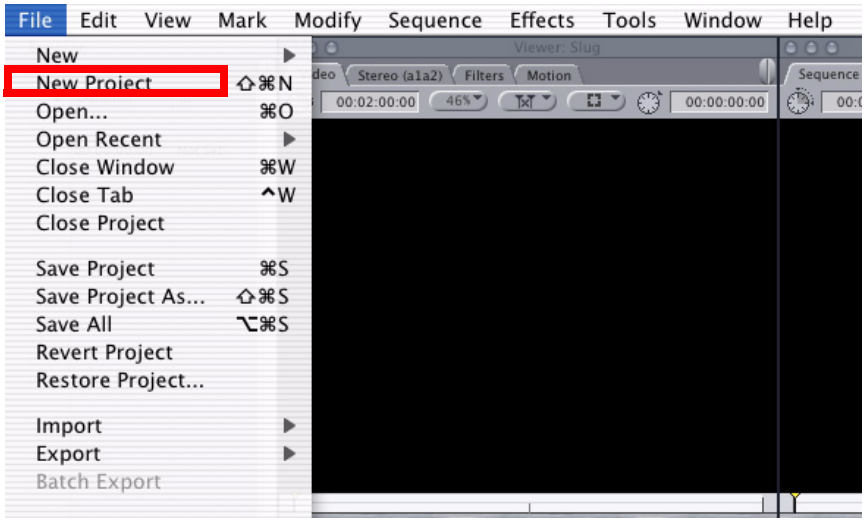
Video." This allows you to select via a pull-down menu any KONA 3G video output and audio output.

The window also allows you to turn on and off device and audio output warnings.

Checking the System with a Simple Test Project of Bars and Tone

To test that you've installed the KONA 3G drivers and have audio and video monitoring correctly configured, try creating a simple Final Cut Pro project with bars and tone.

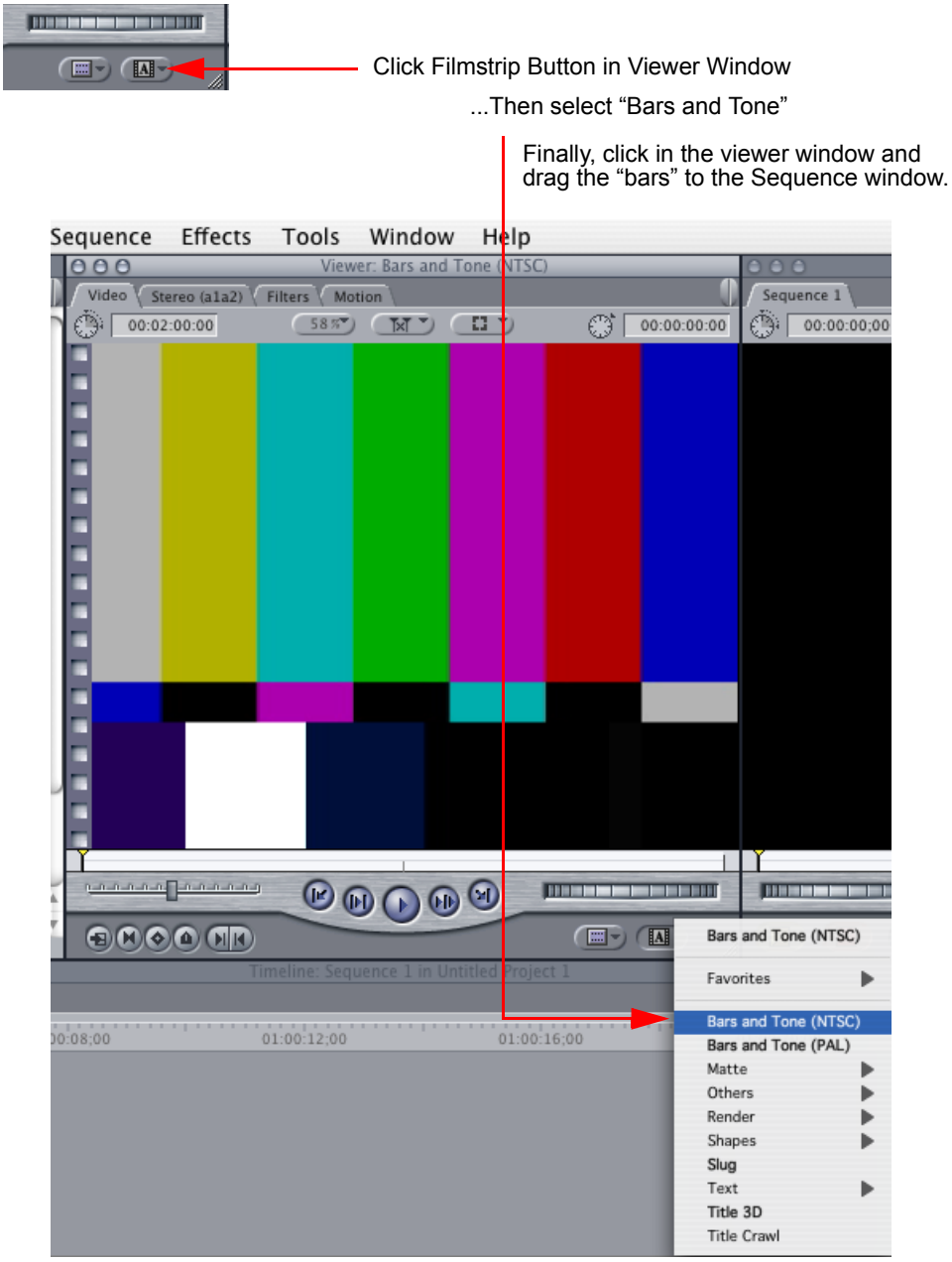
1. Select an Easy Setup as previously discussed (go to the Final Cut Pro menu and select *Easy Setup*; then select a desired preset).
2. Select *New Project* from the File menu.



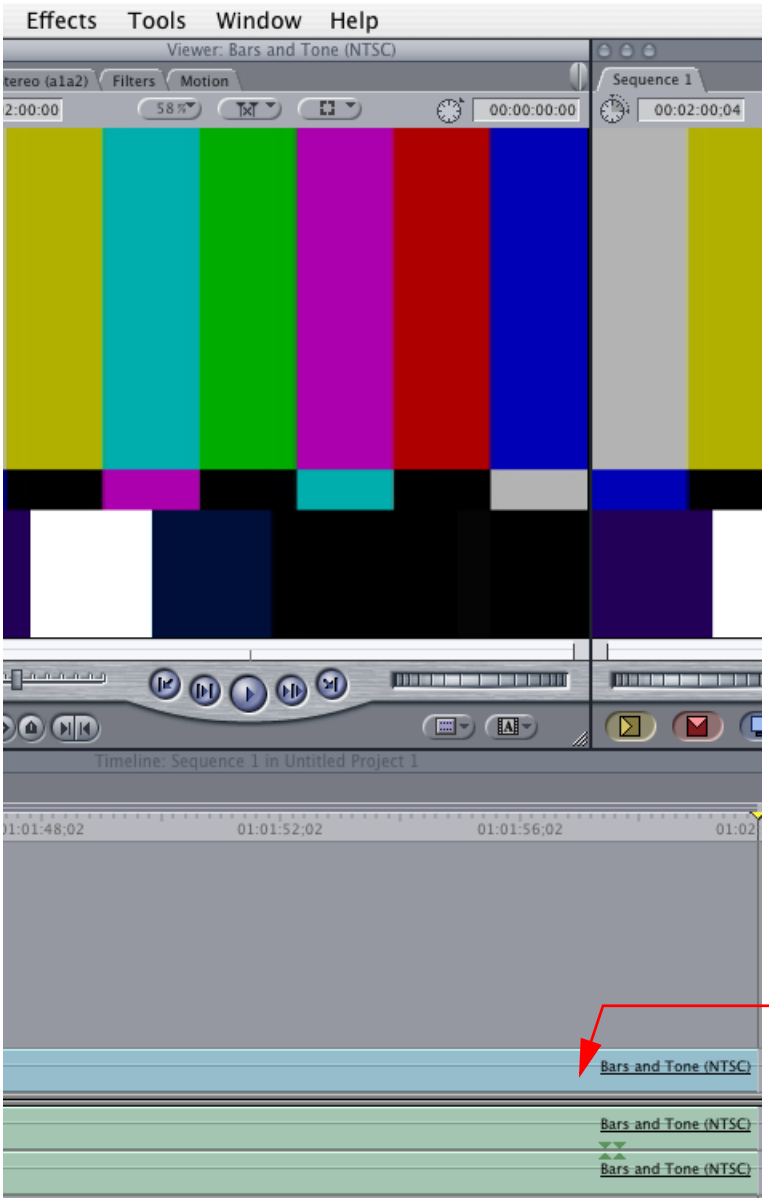
Create a New Project

3. The Sequence window will be at the bottom of the screen and a Browser window will be at the top left. Look at the Browser window and locate the "Effects" tab at the top right. Click on it.
4. Locate the Viewer window in Final Cut and click on the Filmstrip pulldown menu button (it's a "filmstrip" icon with an "A" on it). Select "Bars and Tone NTSC" or "Bars and Tone PAL". The viewer window will display bars after you do this.
5. Click the mouse cursor on the Bars and Tone in the Viewer window and drag it to the beginning of the sequence window. You'll see the bars and tone show up on the sequence where it can then be played.
6. Go to the beginning of the sequence by clicking on the left-most icon and then click the "Play" icon. You should see and hear the bars and tone on your video monitor and audio monitoring system.

If you don't see bars on the external video monitor and hear tone, check your connections and ensure KONA 3G is selected in the Easy Setups and Audio/Video Settings as necessary.



Click and Drag Bars and Tone From Viewer Window to Sequence



Sequence Window Showing Bars and Tone Clip Dragged from Viewer

If everything works properly, go ahead and try capturing audio and video media from your VTR.

Using 8-bit Versus 10-bit Video

While both 8- and 10-bit uncompressed video are capable of providing excellent quality broadcast video, 10-bit represents a significantly higher quality and is preferable in many situations.

Because 10-bit video has four times the numerical precision when compared to 8-bit, it has a signal-to-noise ratio 12 db higher than 8-bit video.

Visually, in 8-bit video compared to 10-bit video, you will notice a substantial difference. In 8-bit video there will be “contour lines” or “striations” visible, particularly noticeable in scenes having soft gradients like a ramp or sunset. For example, if a sky region is mostly the same color but varies by only a few digital numbers from one side of the picture to another, you may see contour lines where the signal passes from one digital value to the next higher value.

Since each numerical value in a 10-bit system is only one fourth as large as an 8-bit system's, these contours become invisible and the sky varies smoothly.

10-bit video is often used when the source and output video (or “master”) is also 10-bit. Even if the input and/or output video is 8-bit, a 10-bit “project” will still maintain a higher quality when there is a significant amount of effects rendering involved.

Industry standard professional mastering formats—Sony Digital Betacam for Standard Definition and Panasonic D5 for High Definition—are both true 10-bit formats.

Chapter 5: Troubleshooting

If You Run Into Problems

One useful way to find the source of problems is to isolate your system to the smallest size wherea the problem still occurs and then note all the symptoms. This serves to eliminate areas not involved in the problem and make finding the problem easier.

Once you've noted problem symptoms, look through the following table and see if any of the symptoms are listed. If so, check the items listed. If you later need to call for customer service, let them know all of the things you've tried and when and how the symptoms appeared.

Table 1. Problem Solving by Matching Symptoms to Remedies

Symptom	Check
Disk RAID cannot keep up (dropped frames etc.).	Ensure the disk system is providing at least 50 MB/second sustained transfer rate
Dropped frames during playback.	1. Canvas/Viewer zoom setting exceeds the fit-to-window setting. Change to "Fit-to-Window." 2. RAID cannot sustain the data rate of the clip/sequence. 3. The sequence setting does not match the "playback output setting" found at FCP Audio/Video Settings -> AV Output. 4. Virus checking software running in the background (disable it). 5. Scratch drive not set to the RAID.
Dropped frames during record.	1. RAID cannot sustain the data rate of the capture preset codec. 2. Virus checking software running in the background (disable it). 3. Scratch drive not set to the RAID.
Media is not being captured from desired external device.	Check the settings in the *Input* tab of the KONA 3 Control Panel application. Also check equipment cables.
Dropped frames during playback	Look for scroll bars in the viewer or canvas as a warning sign that the zoom setting exceeds the fit-t-window.

Table 1. Problem Solving by Matching Symptoms to Remedies

Symptom	Check
Changes made to Final Cut's configuration aren't remembered or you need to force a change to them.	Under some circumstances, Final Cut Pro may need to be initialized back to the factory default state as it was when you installed it. The easiest way to do this is to locate Final Cut's preference file and discard it. To do so, follow this procedure: 1. Locate the file named "Final Cut Pro Preferences". *Note: path to file is "Macintosh HD/users/username/library/preferences/final cut user data."* 3. Click and drag that file to the Trash Can icon and drop it there. When you next start up Final Cut Pro, it will present the "Choose Setup" prompt (as in initial installation) where you can again choose a desired KONA 3 input format in the "Setup For" pulldown and re-enter a desired system scratch disk (your RAID).
Video in the canvas stays frozen during playback.	1. The sequence setting does not match the "playback output setting" found at FCP Audio Video Settings -> AV Output. 2. Canvas/Viewer zoom setting exceeds the fit-to-window setting. Change to "Fit-to-Window."
Video output is black.	1. External video is set to "No Frames" (View -> External Video). 2. The "Playback output setting" found at FCP Audio Video Settings -> AV Output is set to "none" or to a non-KONA 3 device.
Video stutter during playback.	RAID cannot sustain data rate.
Red render bar occurs when placing a clip on a sequence.	The sequence setting does not match the clip setting.

Updating Software

Check on the AJA Video website:

http://www.aja.com/support/konaNEW/kona-3g.php

for software updates. If any are available, download the file and read any associated instructions prior to installing the software.

Support

When calling for support, first check over your system configuration and ensure everything is connected properly and that current Final Cut presets and Easy Setups match what you are trying to do. Even if you cannot find the cause of the problem, having this information at hand will help when you call Apple or AJA Customer Support for help.

If the problem is unknown or you need general help, first contact the dealer where you purchased the product. AJA dealers offer product support for many service requirements.

If the problem is a Final Cut Pro operational issue, Mac system issue, or Xserve RAID issue, then call Apple Customer Support for help.

If the problem is an AJA Video KONA 3 issue, then contact AJA Video Customer Support using one of the methods listed below:

Contacting by Mail Address:

180 Litton Drive, Grass Valley, CA. 95945 USA
Telephone: 1.800.251.4224 or 1.530.274.2048

Fax: 1.530.274.9442

Web: *http://www.aja.com*

Support Email: *support@aja.com*

Apple Resources

Apple provides a large amount of support information online at their support website. Information provided includes answers to top questions, discussions on specific topics, and software downloads for updates and utilities.

You may also enroll in AppleCare for extended support of hardware and software products. Information is provided on the Apple Support website on how to enroll in AppleCare.

General Apple Support Website for information on all products:
http://www.info.apple.com/

Mac Support Area: *http://www.apple.com/support/macpro/*

Final Cut Pro Web Support:
http://www.apple.com/support/finalcutpro/index.html

Appendix A: Specifications

Video Input

SD , HD, and 3G SDI, SMPTE-259/292/424
Single Link 4:2:2
Single Link 3G HD 4:4:4
2K HSDL (High Speed Data Link) 4:4:4

Video Formats

525i 23.98	1080i 25	2K 1080p 23.98	QuadHDsf23.98
525i 29.97	1080i 29.97	2K 1080p 24	QuadHDsf24
625i 25	1080i 30	2K 1080p 25	QuadHDsf25
720p 23.98	1080sf 23.98	2K 1080sf 23.98	QuadHDp23.98
720p 50	1080sf 24	2K 1080sf 24	QuadHDp24
720p 59.94	1080sf 25	2K 1080sf 25	QuadHDp25
720p 60	1080sf 29.97	2K 1556sf 14.98	4Ksf23.98
	1080sf 30	2K 1556sf 15	4Ksf24
	1080p 23.98	2K 1556sf 23.98	4Ksf25
	1080p 24	2K 1556sf 24	4Kp23.98
	1080p 25	2K 1556sf 25	4Kp24
	1080p 29.97		4Kp25
	1080p 30		
	1080p 50a		
	1080p 59.94a		
	1080p 60a		
	1080p 50b		
	1080p 59.94b		
	1080p 60b		

Video Output

Digital:
SD-SDI, SMPTE, 259M, 10-bits, BNC
HD-SDI SMPTE, 292/296, 10-bits, BNC
Dual-link HD 4:4:4 and 2K HSDL 4:4:4
HDMI v 1.4a, 30/36 bits/pixel, RGB or YUV, 2.25Gbps
4K Mode; maps 4 SDI connections as 4 outputs, each a quadrant of a 4K display
Analog SD and HD Output, 12-bits, BNC:
HSD and HD Output, 12-bits, BNC
HD: YPbPr, RGB
SD: YPbPr, RGB (component mode) or
Composite + Y/C (composite mode with
simultaneous Y/C)

Downstream Keyer: can output graphics with alpha channel over video, matte or framebuffer or framebuffer content over video or matte

Audio

24-bit SDI embedded audio, 16-channel, 48kHz
24-bit AES audio, 8-channel, 48kHz, 16-bit capable
16-channel AES and 2-channel unbalanced output (RCA-jack): requires K3G-Box option

Up-Conversion

Hardware 10-bit
Anamorphic: full-screen
Pillar box 4:3: results in a 4:3 image in center of screen with black sidebars
Zoom 14:9: results in a 4:3 image zoomed slightly to fill a 14:9 image with black sidebars
Zoom Letterbox: results in image zoomed to fill full screen
Zoom Wide: results in a combination of zoom and horizontal stretch to fill a 16:9 screen; this setting can introduce a small aspect ratio change

Down-Conversion

Hardware 10-bit
Anamorphic: full-screen
Letterbox: image is reduced with black top and bottom added to image area with the aspect ratio preserved
Crop: image is cropped to fit new screen size

Cross-Conversion

Hardware 10-bit
1080i to 720P
720P to 1080i
720P to 1080PsF

SD to SD Aspect Ratio Conversion

Letterbox: This transforms SD anamorphic material to a letterboxed image.
H Crop: Will produce a horizontally stretched effect on the image; transforms anamorphic SD to full frame
SD Pillarbox: Will produce an image in the center of the screen with black borders on the left and right sides and an anamorphized image in the center
V Crop: Will transform SD letterbox material to an anamorphic image.

Reference Input

Analog Color Black (1V) or Composite Sync (2 or 4V) Non terminating, Looping, 75 ohm on K3G-Box, terminated on supplied breakout cable

Longitudinal Time Code (LTC)

One input
One output

Machine Control

RS-422, Sony 9-pin protocol. 9-pin D-connector pinout is as follows:

1 ..... GND	6 ..... GND
2 ..... RX-	7 ..... RX+
3 ..... TX+	8 ..... TX-
4 ..... GND	9 ..... GND
5 ..... No Connection	Shell ..... GND

Appendix B: Glossary

Reference Terms

3:2 Pull Down

3:2 pull down is a process where six frames are added to a film's original 24-frames-per-second format so that it can work within the 30 fps NTSC standard.

24P

A term for 24 full frames per second digital video progressively captured. It generally refers to the HD format of 1920x1080, although it is also used with 1280x720 images as well.

1080i

Refers to a picture resolution of 1920 vertical pixels by 1080 horizontal pixels. The "i" stands for interlaced scanning. Interlaced scanning is based on the principle that the screen shows every odd line at one scan of the screen and then all the even lines in a second scan.

1080p

Refers to a picture resolution of 1,920 vertical pixels by 1,080 horizontal pixels. The "p" stands for progressive scanning. This format works on the same principle as 720p; the only difference is that in this type there are more pixels and the resolution is better.

1080psf

1080psf differs from 1080p defined previously; PSF is an acronym for "Progressive Segmented Frame". Like 1080p, psf is progressive, but it differs in that the data is written as two separate "fields" (but without inter-field motion as interlaced video carries). This provides psf with the temporal motion characteristics of progressive video, but with the data transport ease of interlaced video. There should be no visual difference between the display of a progressive frame communicated as 1080p, and the same frame communicated as 1080psf.

16:9

Refers to the aspect ratio of movie screen and widescreen DTV formats used in all HDTV (High Definition TV) and some SDTV (Standard Definition TV). The ratio is 16 arbitrary units of width for every 9 arbitrary units of height.

4:3

The aspect ratio of traditional National Television Systems Committee (NTSC) TV screens. The ratio refers to four units of width for every three units of height.

720p	Refers to a picture that is 1,280 vertical pixels by 720 horizontal pixels. The “p” stands for progressive scanning. Progressive scanning offers a smoother picture as 720 horizontal lines are scanned progressively or in succession in a vertical frame repeated 30 times a second.
Anamorphic video	Refers to video images that are “squeezed” or “stretched” (depending on whether the video is being upconverted or downconverted) to fit a video frame. When 16:9 anamorphic video is displayed on a 4:3 screen size (downconvert), the images will appear unnaturally tall and narrow.
Aspect ratio	A ratio of screen width to height. It may be traditional 4:3 or 16:9 widescreen.
ATSC	An acronym for Advanced Television Systems Committee, which is responsible for developing and establishing Digital-HDTV Standards. It is also the name of the DTV system used by broadcasters in the U.S.
Barn Doors	When a 4:3 image is viewed on a 16:9 screen, the viewer sees black bars on the sides of the screen, sometimes referred to as “barn doors.”
Codec	A short term used for both “Compressor-decompressor” and “Coder-decoder.” In terms of Final Cut Pro and most editing and graphics applications, codec generally means “Compressor-decompressor”, which, whether hardware or software, converts video and audio signals to and from a compressed digital format. (“Coder-decoder” is generally a device that converts analog video and audio signals into a digital format for transmission, and also converts digital signals back into an analog format; depending on the application, it can also have alternate meanings.)
Decoder	See “codec.” A device or program that translates encoded data into its original format (i.e., it decodes the data.).
Deinterlacing	The process of converting an interlaced-scan video signal (where each frame is split into two sequential fields) to a progressive-scan signal (where each frame remains whole). Advanced de-interlacers include a feature called 3-2 pulldown processing. Sometimes de-interlacing is referred to as "line-doubling."
Downconvert	Refers to format conversion from a higher resolution input standard to a lower one. For example, converting a 1080 input to a 525 display (HD to SD).
DTV (Digital Television)	DTV stands for Digital Television. It refers to all digital television formats and standards established by the Advanced Television Systems Committee (ATSC). Two basic DTV standards are HDTV (high-definition television) and SDTV (standard-definition television)
Frame rate	The rate at which frames are displayed per second. Frame rates are used in synchronizing audio and pictures for video and film. In motion pictures and television, the frame rates are standardized by SMPTE (Society of Motion Picture and Television Editors). SMPTE frame rates of 24, 25 and 30 frames per second are very common, with a great number of others also used. Frame rates have different applications and uses in different workflows. For motion pictures 24 frames per second is common, while in standard definition television 30 frames per second is common in the US (NTSC). Higher frame rates produce smoother motion but also create larger file storage requirements.

HDTV (High-Definition Television)

High Definition Television refers to the highest-resolution formats of the DTV formats. Offering twice the vertical and horizontal picture resolution of standard definition, an HD picture is much sharper. HDTV has a widescreen aspect ratio of 16:9. HD formats 1080i and 720p both offer reduced motion artifacts like ghosting and dot crawl.

HD-SDI

Refers to a high definition signal provided on a serial digital connection.

High Definition

A video format consisting of either 720 active lines of progressive video or 1080 active lines, using either progressive or interlaced scanning.

Interlaced Scanning

A scanning method based on the visible screen showing every odd line at one scan of the screen and the even lines in a second scan.

Letterbox

Letterbox refers to the image of a wide-screen picture on a standard 4:3 aspect ratio screen. Usually black bars are shown above and below the picture to fill the unused space. Letter-boxing maintains the original aspect ratio of the source (often a film source of 16:9 aspect ratio or wider).

Luminance

The brightness or black-and-white component of a color video signal. Luminance determines the level of picture detail.

Progressive Scanning

Progressive scanning provides a picture made up of 720 or 1080 horizontal lines scanned progressively in succession, within a vertical frame. The frame repeats 30 times a second.

Resolution

Resolution usually refers to the density of lines, and dots per line, that represent an image. It is measured by the number of pixels displayed. A higher number of lines and dots provides sharper and more detailed picture content. Analog television pictures have over 200,000 color pixels while HDTV—at 1080 vertical pixels by 1920 horizontal pixels—offer greater than 2 million pixels per picture.

Sampling

A digital process by which analog information is measured in intervals to convert analog to digital.

SDTV (Standard-Definition Television)

Standard Definition Television pictures are higher quality than NTSC, however, they do not reach the quality and resolution of HD. SDTV is based on 480 lines of vertical resolution, available with both interlaced and progressively scanned formats.

SD-SDI

Refers to a standard definition signal provided on a serial digital connection.

Upconverting

Process by which a standard definition picture is changed to a simulated high-definition picture.

Widescreen

Widescreen TV is a picture with a 16:9 aspect ratio. 16:9 is the aspect ratio of movie screen and widescreen DTV formats used in all HDTV (High Definition TV) and some SDTV (Standard Definition TV); it stands for 16 units of width for every 9 units of height.

Appendix C: Working with 2K Workflows

Introduction

This chapter provides a simple overview of 2K workflow and how the KONA 3 can be used as an integral part of it.

Overview of 2K and Its Uses In Digital Cinema

2K is a term, like SD and HD, used to describe a particular image size and quality of data. 2K data exceeds our pre-existing television broadcast standards for both SD and HD and is therefore most commonly associated with traditional cinema and the emerging digital cinema initiative.

As a point of reference, HD is commonly referred to by the 1920x1080 or 1280x720 pixel frame sizes. 2K, like HD, is commonly defined by two basic frame sizes. When working with data for eventual cinematic projection, FX work or digital intermediate purposes, 2K is usually defined as 2048x1556 pixels. This size represents the “full” size of the 35mm film between the sprockets. Therefore the result, 2048x1556 pixels, appears as a 4x3 image when compared to an HD image which is typically 16x9. In 2K, other images sizes can be derived from this 2048x1556 source by taking a cropped portion of the image for use or via scaling of the image. For a traditional cinematic projection scenario, the final delivery of this 2048x1556 data is onto 35mm film. The film then undergoes photochemical and mechanical processes before the image (digital image) reaches the screen.

The other common size attributed to 2K is 2048x1080 and this is the standard to which digital cinema currently adheres. Most digital cinema projectors have this 2048x1080 image size as a supported resolution and in many cases, as a maximum resolution.

So the first obvious advantage of working with 2K images as opposed to HD images when considering a traditional cinematic path is the size of the image that can be generated, worked with, and ultimately projected. Some will argue that a better choice for cinematic work is a 4K resolution. Certainly this is true, but this requires double 2K's already large data requirements to be handled and therefore is beyond the scope of nearly most modern equipment be it scanners, storage or projectors. To be fair, some 4K and beyond resolution is
already being performed for select feature films and even then for select shots in many cases. Perhaps in the future 4K will supplant 2K as HD has SD but that day seems to be quite distant so for now a large body of the motion picture community has settled on 2K as a high quality image size.

2K Color: More Like Film than Video

2K images, like SD and HD images, can come in 8 bit, 10 bit, 12 bit, 16 bit, and other sizes. But most commonly, 2K files are written in a 10 bit Log RGB or RGB format. This provides for 1024 gradations of a given color in three equivalent

colors of red, green and blue. By using RGB, 2K data can emulate, to some extent, film—which achieves its color reproduction via red, green and blue layers of emulsion.

The actual 2K image sizes of 2048x1556 and 2048x1080 are usually written in two similar, but slightly differing, file formats: Cineon or DPX (Digital Picture Exchange format). The Cineon file format traces it's roots back to one of the earliest "film as digital" devices, the Kodak Cineon. The Kodak Cineon, introduced in 1992, was a scanner that took film images and translated them into digital data. Today many devices from a number of manufacturers allow for such a process.

Since files bearing the .cin extension were always related to film, they tend to always be in Log RGB. Log RGB is a color scheme designed to best approximate the characteristics of film emulsion in a digital environment. An easy analogy is this: Log RGB is like a "digital film negative" while linear RGB (usually just referred to as RGB) is like a "digital film positive." To transform a log RGB image into a "positive", Look Up Tables (LUTs) can be applied to the image so that before, during or after processing the raw image can be seen as it would be if it were a finished product.

As already mentioned, Cineon files are not the only file format that can be used to house the 2K data. DPX (Digital Picture Exchange) is quickly becoming the standard since being defined by SMPTE. Like files bearing the .cin extension, files bearing the .dpx extension can be Log RGB, but they can also be linear RGB.

Cineon and DPX files at full size, 2048x1556 and full 10 bit quality tend to exist as individual frames that occupy 12.2 MB of data. At 12.2 MB/sec., data rates for a second of video climb to 291.5 MB/sec. By comparison, the highest quality HD video images rarely exceed 200MB/sec. and most HD formats use only a little over 100MB/sec. Furthermore, HD material is usually somewhat compressed in order to be recorded onto tape formats, whereas the 2K data can achieve an uncompressed status having never had to be recorded onto a tape, but instead directly recorded onto a harddrive.

If the first major advantage of working with 2K images is their size, then the second advantage is their handling of color. A 2K color scheme can be used that more closely emulates films properties than video. Furthermore, this color information need not be compressed due to the limitations of tape recording, but rather the data can be dealt with as uncompressed.

The Source of 2K Data: Scanning, Telecine and Digital Cameras

Until recently, the only way to acquire a 2K image was to shoot on 35mm film and then scan the original camera negative (OCN). To be fair, most 2K data is still generated in this method since film is still seen as the de facto medium for recording moving images for projection at the highest possible resolution. 2K scanning has persisted as the solitary method of creating 2K data until recently when a handful of telecine machines have come on the market that can move data at 2K resolution.

Now we are seeing the first generation of what can truly be referred to as "digital cinema" cameras as they lack video recording devices, specifically tape recording capability, in their design and instead concentrate on producing electronic data that aims to emulate the image quality of traditional photochemical film processes. This era is still early in its development but the pace of development promises that it will soon draw close to the quality, and in some users opinions, the ease of use of capturing images to motion picture film.

Transporting 2K Data: HSDL Defined

Moving 2K data is no small task; remember that at 12.2MB/frame, data moves at nearly 300MB/sec. Storage devices, such as RAIDs or SANs must have very high bandwidth capabilities to handle recording or playing back data at full speed. The storage devices must also have adequate space to hold this data as an hour of 2K just exceeds 1 Terabyte.

But storage devices are for storing the data; transporting the data is something different. HSDL (High Speed Data Link) is easiest for video professionals to understand in this way: HSDL is like Dual Link HD for the transmission of 2K data. Where Dual Link HD moves across two SDI cables as

video, HSDL moves 2K data over the SDI cables. Because of the amount of data previously mentioned, full size 2048x1556 images cannot be transmitted over the dual SDI lines at full frame rate. Instead of moving the data at 23.98 (24) frames per second, the HSDL transport stream often adheres to 14.98 frames per second. Because this is transmitted data, not video, the data can be recorded at the 14.98 frames per second rate to a high speed storage device and then played back from this high speed storage device at full speed, typically 23.98 frames per second. In contrast to 2048x1556 images, 2048x1080 digital cinema 2K can move across HSDL at the full frame rate of 23.98 frames per second.

Facilities with two lines of HD-SDI rated cable, in a limited sense, are already prepared for the transmission of 2K data when attached to HSDL devices. If a facility already has storage that can exceed 300MB per second, that facility might also be ready to record and play back 2K data at full frame rate. Again, this transition to a "digital film" environment is far less cumbersome than a 4K digital environment where such numbers double those of 2K.

So a third advantage, beyond image size and color reproduction, is the ability of 2K data to use pre-existing elements of HD infrastructure when adopting 2K. For many facilities, be they large full-service or boutique, this makes the financial transition from HD to 2K less of a burden. While a transition to 4K would produce higher quality for most facilities, it would not be nearly as easy to achieve financially.

The AJA KONA 3: An Ideal 2K Input/Output Device

Opening the door to data-centric workflow and universal mastering, the AJA KONA 3 card represents a perfect input/output device (capture card) for facilities considering entering the "film as digital" landscape. The card is ideal because it's capable of working with SD, HD, Dual Link HD and 2K. The KONA 3 card can receive and send 2K data via HSDL—making it compatible with a number of devices such as telecines and digital disk recorders (DDRs) already on the market and working with 2K data.

The advantages of using the KONA 3 as an input/output device extend beyond its 2K HSDL functionality. Not only can users ingest 2K data as simultaneous 2K DPX files and QuickTime files, edit this information, and then output 2K data, but users can also elect to ingest 2K data and output simultaneous HD from a crop directly derived from the 2K media. An SD downconvert of this HD video can also be created simultaneously, if so desired. For review of 2K data on HD and SD monitors, and for some mastering scenarios, the KONA 3 card can be used as a very flexible and effective tool.

Existing 2K data files in the Cineon and DPX file formats can be "wrapped" into 2K QuickTime Reference Movies via AJA's DPXToQT Translator application so that users can take advantage of the aforementioned flexibility without writing any new data to their drives. QuickTime reference movies only point back to the source original DPX files from which they are derived. The main advantage of this, beyond not writing any new data to the drives, is that the cumbersome sequence of potentially thousands of frames can be consolidated non-destructively to a single file.

Furthermore, once media exists as a 2K QuickTime movie, it can be converted back into sequential DPX files that can be given to facilities using software or hardware, such as film recorders, that do not accept QuickTime files. This conversion can be accomplished via the AJA QTToDPX Translator application. This process, it should be noted, does require writing new data because it may reflect creative changes to the images that the user desired, such as effects.

Note: The QTToDPX Translator and DPXToQT Translator are both available from the AJA website in the KONA 3 support area:
www.aja.com/html/support_kona3_swd.html

AJA Video Systems, Inc. along with other 2K HSDL device manufacturers, has seen the growing need for a high quality image source, like 2K, in an evolving data-centric workflow. A 2K source can be used to derive the high quality film, digital cinema, HD and SD deliverables without compromise outside of a cumbersome leap to 4K. 2K capable devices, like the AJA KONA 3 card, will help facilities and filmmakers enter a data-centric workflow that results in a universal mastering environment.

The KONA 3 2K Process—Ingest to Output

The following step-by-step procedure outlines the task of bringing in 2K material from telecines or other HSDL devices connected to the dual SDI inputs on the KONA 3 card. The 2K ingest process requires the use of the AJA *VTR Xchange* software and configuration of the AJA KONA Control Panel.

The procedure for ingest of 2K is as follows:

1. Connect the telecine with HSDL output (or other HSDL output capable device) to the KONA 3's two SDI inputs. (If you already have 2K DPX or Cineon files on storage capable of 300MB/sec., you can elect to use the AJA *DPXToQT Translator* application to "wrap" the sequential DPX or Cineon files to QuickTime Reference Movies. If this is the case, skip ahead to step 6 of these instructions.
2. Configure the AJA Kona Control Panel as follows:

   A. For the Input tab of the KONA Control Panel, make certain that *Dual Link* is selected for Video Input.

   B. For the Format tab of the KONA Control Panel, make certain that the Video Format for Primary and Secondary is matched and matches the incoming "video"—which should be indicated in the graphic portion of the KONA Control Panel next to the SDI in 1 and SDI in 2 icons.

3. Run AJA VTR Xchange software. Go to the *Capture* pulldown menu in the application and select Video Settings. Choose *Source* from the three options of Adjustments, Compression and Source. From within this menu, select the appropriate format that is being indicated in the KONA Control Panel, i.e. 1556x2Kpsf14.98 10 Bit (2048x1556) Now select *Compression* from the three choices of Adjustments, Compression and Source. In the pulldown for Compression type, select *AJA Kona 10-bit Log RGB Codec* or *AJA Kona 10-bit RGB Codec.* (For maximum flexibility, and with most equipment, the *AJA Kona 10-bit Log RGB Codec* will be the best choice.) For the *Frames per second,* select 23.98 as this is the frame rate that will be set for the QuickTime Reference Movie that you will create simultaneously with the sequential DPX files. From the Preferences (AJA VTR XChange pulldown menu), look under the Capture heading and select *Save as Numbered Files*. You should also select a storage device capable of a minimum of 300+MB/sec. for the data under the Capture heading, Captured Clips Folder; if no selection is made, the application will prompt you to choose a location for your captured media.
4. You're now ready to capture the material from the 2K output device. Begin playback on a non-controllable device or mark in and out points for a clip coming from a controllable device (like a digital disk recorder). If you have no device control, you can only select "*capture now*"—meaning that you will be crash recording the data onto your disks. If you do have a device that can be controlled, you can set in and out points and then select "capture".
5. While capturing, VTR Xchange is creating the QuickTime Reference Movie and the series of sequential DPX files; these files are written to the target folder defined by the VTR Xchange application based on the selection you made for their location from within the *Preferences>Captured Clips* Folder.
6. For editorial, run Final Cut Pro. From within the Final Cut Pro application, go to the Final Cut Pro pulldown menu and choose Easy Setup. If the *Show All* checkbox is not checked, check it and then from the pulldown, select the 2K easy setup that reflects your media (If you ingested from telecine, in all likelihood you will select the *AJA Kona 3- 2K x 1556 psf 23.98 10 Bit Uncompressed Log RGB* as an example.) Within your new project you can import the QuickTime Reference Movies created by VTR Xchange into the Browser window.

Note: Note: Since these QuickTime movies reference the 2K sequential DPX files, you will be able to play and scrub the footage as expected, however if you wish to play the footage backward, be sure to adhere to first holding down the "K" key on the keyboard and while holding this key, then the "J" key can be depressed for reverse playback. This is simply a limitation of reading the sequential DPX files; all other functions such as scrubbing the playhead in the timeline or using the "L" key for forward play and transport will behave as expected. In the event that you do use the "J" key solely, you may experience a lag and will need to wait for the application before further operations can be performed.

7. You can elect to either view the footage out of the card on monitors in one of three ways (two of which may occur simultaneously) or output from the Kona 3 card via HSDL to

another HSDL compliant device. For monitoring, the 2K Crop tab of the Kona Control Panel can be configured to output 1920x1080 from the 2K source. These settings are described in Chapter 4 earlier in this manual under the description of the *"2K Crop Screen."*
The 1920x1080 crop can be sent to a Dual Link HD-SDI capable monitor by connection of both of the HD-SDI outputs (Link A and Link B) of the KONA to the Dual Link inputs of a monitor. Or if a single link HD output is desired, the signal may be routed via single link HD-SDI out from the card. An additional single link HD-SDI output can be obtained from the card or one SD-SDI output from the card—both of which can happen simultaneously. The component output of the card can also be configured to output HD or SD in conjunction with the SDI outputs. The settings for the various outputs are accessed via the KONA Control Panel's *Format* tab by setting the Secondary (Converted) Format. For HSDL output, the 2K Crop function must be turned to *Off* in the Crop Mode and from the *Digital Out* tab of the KONA Control Panel, *Dual Link* must be selected.

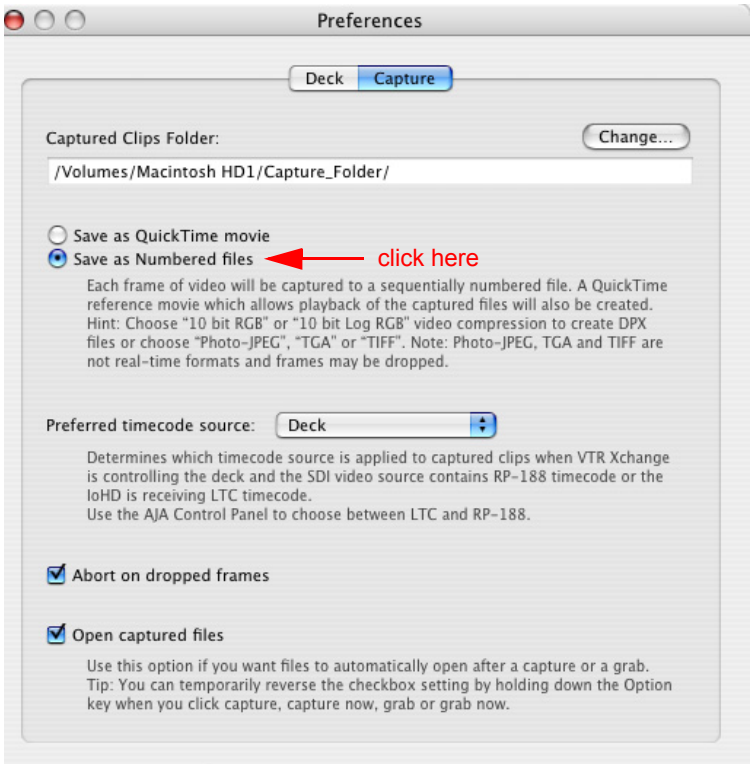
8. For HSDL output, you can select to output 2048x1556 at 14.98fps (which is a standard among many HSDL devices), or you may elect to output via HSDL 2048x1080 at 23.98fps, which is what digital cinema devices tend to use. Or, you may elect to output the timeline as a QuickTime movie that can be translated back into a sequence of DPX files via the AJA *QuickTimeToDPX* Translator application.

Note: Note: This may be necessary for some devices and applications that do not accept QuickTime files or the AJA Kona 10-bit Log RGB or AJA Kona 10-bit RGB codecs but instead accept DPX files.

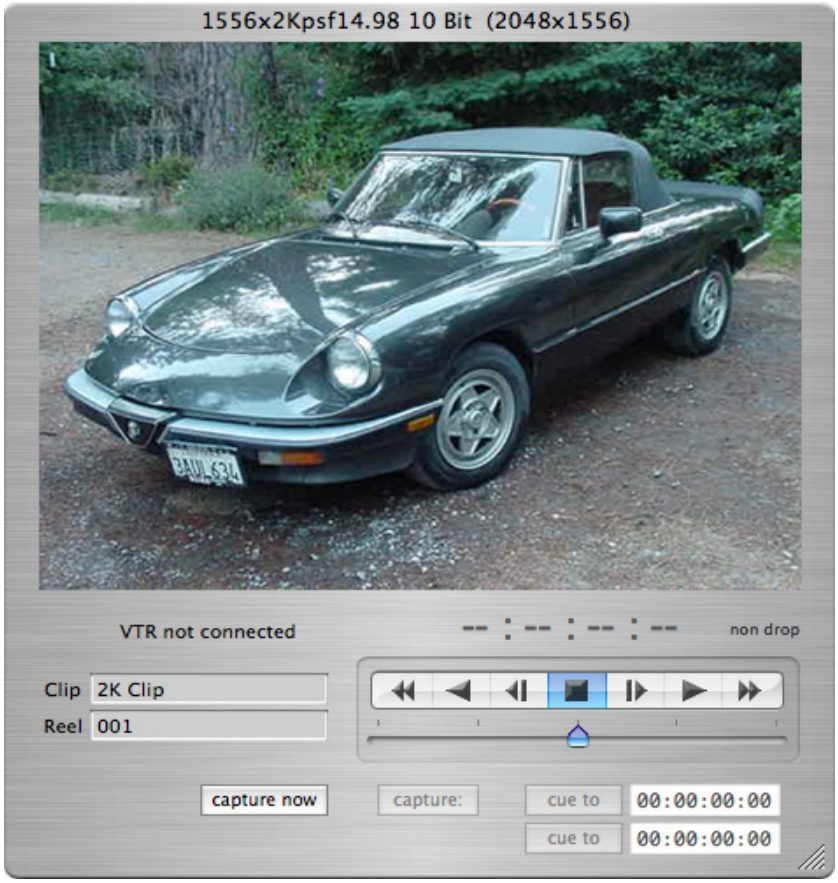
Additional Advice

Due to the flexible nature of Final Cut Pro, the timeline where the 2K files reside during editing, can be sent to other applications to be worked on at 2K resolution; Motion and Shake are examples of this. The 2K edit in Final Cut Pro can be referred to by other applications via XML or EDL, like Silicon Color's Final Touch 2K, so that the 2K DPX files or their associated QuickTime Reference Movies may be accessed.

Note: KONA Utility Applications that can be used for 2K Workflow. All are available free from:
www.aja.com/html/support_kona3_swd.html


Preferences
Deck
Capture
Captured Clips Folder:
Change...
/Volumes/Macintosh HD1/Capture_Folder/
Save as QuickTime movie
Save as Numbered files
click here
Each frame of video will be captured to a sequentially numbered file. A QuickTime reference movie which allows playback of the captured files will also be created. Hint: Choose "10 bit RGB" or "10 bit Log RGB" video compression to create DPX files or choose "Photo-JPEG", "TGA" or "TIFF". Note: Photo-JPEG, TGA and TIFF are not real-time formats and frames may be dropped.
Preferred timecode source:
Deck
Determines which timecode source is applied to captured clips when VTR Xchange is controlling the deck and the SDI video source contains RP-188 timecode or the IoHD is receiving LTC timecode.
Use the AJA Control Panel to choose between LTC and RP-188.
Abort on dropped frames
Open captured files
Use this option if you want files to automatically open after a capture or a grab.
Tip: You can temporarily reverse the checkbox setting by holding down the Option key when you click capture, capture now, grab or grab now.

VTR Xchange Preferences Screen—Click "Save as Numbered Files" for file-per-frame capture



VTR Xchange Main Window Screen

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